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FOOD SERVICE ALTERNATIVES FOR MEALS AWAY FROM THE DINING FACILITY

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report recommends food service alternatives for feeding Air Force personnel meals away from the dining facility. The studies focused primarily on the food service requirements of missile maintenance and aircraft maintenance groups as well as security police. The personnel group's duty characteristics and current means of obtaining food service were used to determine alternative means of obtaining meals while on duty. Factors affecting the suitability of alternate

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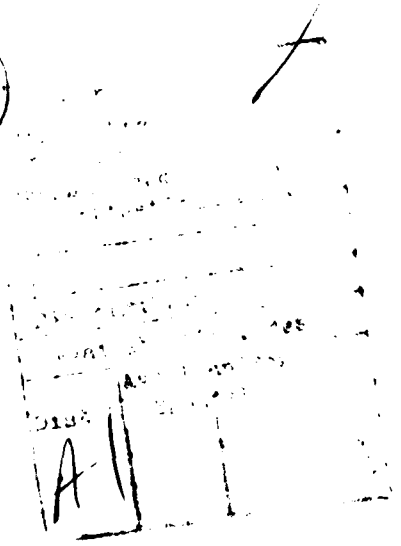
20. Abstract (continued)

food services for personnel groups are group size and group mobility. Two food service concepts are recommended for the personnel groups surveyed. One concept recommends the establishment of a fixed facility at the duty location of the personnel group it is servicing. Two specific food service operations, the satellite dining facility and modular unit are recommended and detailed in the report as meeting the requirements of this concept. The second concept recommends the establishment of a facility to satisfy the food service needs of multitype groups. A central deli operation is specifically recommended to fulfill the second concept. Each of the food service operations is detailed in terms of menus, concept of operation, facility layout and food service equipment.



SUMMARY

Certain ground personnel in the Air Force, including security police, flight-line maintenance crews, and missile maintenance crews, perform duties that often prevent them from attending meals at the dining facility. In these instances, current Air Force regulation specifies the use of a ground meal for feeding personnel. Examples of ground meals are bag lunches, hot A-ration meals, commercial frozen dinners, and foil packs. A ground meal has been found to be an unacceptable substitute for a dining facility meal.

This analysis identifies the personnel groups requiring meals, their duty characteristics, and the reasons they are unable to attend meals at the dining facility. Alternative systems are proposed and evaluated to determine their applicability to personnel away from the dining facility, and recommendations are made.

Nine Air Force bases were surveyed to obtain the information required to analyze the problem of providing meals away from the dining facility. During FY 81 and 82 Kirtland, Loring, Minot, Grand Forks, Wurtsmuth, Nellis, Holloman, Fairchild, and Whiteman Air Force bases were visited. On the basis of this survey three Air Force personnel groups were identified as having the greatest requirement for meals away from the dining facility. Security police, flight line maintenance personnel, and missile maintenance personnel not only required meals more often than other personnel but the nature of their duties also made it more difficult for these groups to attend meals at the dining facility.

Three operations are proposed for feeding Air Force personnel away from the dining facility. A central deli operation is recommended for personnel groups whose size or mobility precludes them from being efficiently serviced by food service personnel at their duty location. This take-out operation uses a made-to-order system for sandwich preparation. Salads, soups, beverages, and desserts are also provided on a self-service basis. The recommended menu items were selected on the basis of their ability to maintain their quality until time of consumption. At the Air Force bases surveyed, missile maintenance crews and security police would be best serviced by this operation.

Two other operations, the satellite dining facility and the modular unit, are recommended for personnel groups whose sizes are large enough to be serviced by food service personnel without a loss of food service productivity. These operations are primarily take-out in nature, but a limited amount of seating is provided. The recommended menus feature items that are prepared quickly and served to customers as they wait. These operations are most suited to the food service needs of flight line maintenance personnel.

It is recommended that the concepts proposed in this report be evaluated with respect to their effectiveness, by means of a test conducted at an Air Force base utilizing the three personnel groups identified above.

PREFACE

During FY 82 and 83, the Directorate for Systems Analysis and Concept Development (DSACD) of the US Army Natick Research and Development Center evaluated new methods of providing meals to Air Force personnel away from the dining facility. This O&MA service requirement was conducted under Production Engineering in support of the DoD Food Program P728012.19.

The author would like to acknowledge Mr. Harry Kirejczyk for his direction and advice during the developmental stages of the alternative systems, Ms. Donna Howard for her research and technical assistance, Mrs. Cheryl Stoops and Mrs. Marilyn Gerwaski for their word processing and secretarial skills, Ms. Marcia Lightbody for her editorial assistance, Major Joel Rutledge for his help in coordinating the data collection, Mr. George Turk for his effort in developing equipment descriptions and layouts, Dr. D. Paul Leitch for his guidance and support, and Mr. Philip Brandler, who, in his capacity as Director, DSACD, supported all phases of the project.

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I. INTRODUCTION

The objective of this project is to recommend systems for providing meals to Air Force personnel located at work sites removed from on-base food service facilities.

This report documents the results of the analysis of data collected from nine Air Force bases and recommends systems capable of servicing the needs of personnel groups at particular duty locations. For each alternative system, menus, equipment, and concepts of operation are specified and the feeding situation for which the system will be most suitable is identified.

Background

The phrase "ground personnel" in the Air Force encompasses a va ty of personnel types and duty locations. Examples of ground personnel ar ecurity police, aircraft maintenance, and missile maintenance crews. These er nel perform support functions vital to the proper execution of the base mission.

On-duty ground personnel can be dispatched to locations far removed from the main activities of the base, perform a duty restricting them to a particular location or be required to perform continuously duties for extended time periods. In each case, the ability of the personnel to obtain meals from the dining facility is severely limited.

A variety of meal types including bag lunches, commercial frozen dinners, and foil packs are used to satisfy the requirements for ground support meals. Current Air Force doctrine regarding provisions for feeding ground personnel specifies that the "Ground Support Meal is used when a meal must be consumed away from the dining hall.... Frequent and continued use of these meals must be avoided if possible".[1] A discrepancy exists between the intended and actual use of the Ground Support Meal in that ground meals for many personnel are the only food service means available to them when on duty.

This report highlights the reasons for the disparity between Air Force doctrine and actual use of the ground support meal and recommends alternative systems capable of providing complete meals when a meal must be consumed away from the dining facility.

Technical Approach

The recommended systems for providing meals to personnel away from the dining facility were selected after a thorough review and an analysis of existing systems and methods were conducted. The analysis was conducted in three phases: data collection, problem identification, and development of alternative solutions.

Data Collection. Nine Air Force bases, representative of the Strategic Air Command (SAC), Tactical Air Command (TAC), and the Military Airlift Command (MAC), were surveyed to define current ground feeding systems in use, to identify the customers for these systems and to define current resource levels for base food service. Wurtsmuth, Whiteman, Kirtland, Loring, Minot, Grand Forks, Fairchild, Holloman and Nellis Air Force bases were visited. These bases were selected by the Air Force as a representative sample of current systems that provide food service to personnel away from the dining facilities. The data collection was facilitated by use of standard forms (see Appendix A).

Information on customer food preferences and desired services was obtained from the interviews with recipients of meals away from the dining facility.

Problem Identification. Data collected at the nine bases were analyzed to identify problem areas. The constraints within which feasible solutions were to be developed were also defined, including food service staffing and funding levels, size of customer groups, work schedules, and food preferences of customers.

Development of Alternative Solutions. Alternative solutions to the problem were developed by analyzing state-of-the-art methods of providing meals in comparable situations and determining the suitability of these methods to the problem at the Air Force bases. Menu, equipment, service concepts, and staffing of such other systems were studied.

Evaluation of Alternatives. The applicability of alternative solutions was evaluated with a view toward balancing the projected level of acceptability of the system against the required staffing level in order to achieve the most acceptable system requiring the smallest staff. It was found from the data that Air Force personnel prefer eating in the dining facility to any of the existing ground meal options they are currently offered. Further, the food service staff surveyed indicated that in their opinion the dining facility operation is the most efficient system in terms of output of meals. However, either the small numbers of personnel at a duty location or their mobility preclude the establishment of a separate dining facility as the optimum solution for efficient use of manpower. Personnel groups requiring meals were therefore classified in terms of their size and mobility to determine efficient staffing levels for acceptable food service to each particular group.

After determining the appropriate food service staffing levels for each group, existing and proposed alternative systems were evaluated using a customer acceptance model. The model contains those factors contributing to high acceptance of the dining facility as well as other factors reflecting the surveyed preferences and requirements of differentiated personnel groups. The evaluation indicated which system appeared to be most suitable for the different customer groupings identified.

II. CURRENT SYSTEMS

Customer Groups

Air Force Regulation 146-15 states that use of a Ground Support Meal or ground meal* is authorized to personnel when a meal must be consumed away from the dining facility. The principal personnel groups with a ground meal requirement are the security police and maintenance personnel. Both groups are consistently represented at each base and also make up the majority of the current recipients of ground meals.

Table 1 depicts the personnel groups, their duty locations, shift strengths, duty schedules, and current provisions for meals. Data were not collected on all groups at every base if the requirements and characteristics of a particular group at the base were typical of other groups previously surveyed. Instead, an attempt was made to isolate and analyze personnel requirements at each base that were typical of other bases not included in the survey.

Other personnel, such as civil engineers, data automation personnel, machine operators, and fuels and supply personnel, have a requirement for ground meals that is less frequent than that of security and maintenance personnel. Therefore, this investigation is limited to the food service requirements of security police and maintenance personnel, under the assumption that any alternative concepts developed will also be able to accommodate those personnel who use the ground meal less frequently.

Duties and Locations

Maintenance personnel and security police perform a variety of functions at many areas of the bases. At times these personnel were able to attend meals at the dining facility.

The three main reasons why personnel could not attend meals at the dining facility were inconvenience due to distance between duty location and dining facility, inability to relieve personnel due to limited manpower or increased workload, and incompatibility of hours of dining facility with work schedules of personnel. The three main duty locations for security police and maintenance personnel where a requirement for meals exists are the Weapons Storage Area (WSA), flight line, and missile field. Table 2 breaks down these locations versus personnel type and explains why personnel on duty at these locations are unable to attend meals at the dining facility.

* Although AFR 146-15 refers to meals obtained away from the dining facility as Ground Support Meals, the term "ground meal" is used interchangeably.

TABLE 1. Breakdown of Personnel Characteristics by Bases Surveyed

Duty Locations / Personnel Types		Loring	Minot	Nellis	Kirtland	Holloman
Weapons Storage Area	Number of Security Police/Shift	12	19-20	42	130*	N/A
	Shift Schedule of Security Police	0700-1500 1500-2400 2400-0700	0700-1500 1500-2400 2400-0700	0630-1430 1430-2230 1030-0630	0700-1600 1500-2400 2400-0700	
	Current Meal Systems Provided	1. Bag Lunches 2. TV Dinners	1. Bag Lunches 2. Foil Packs 3. TV Dinners	1. Separate Dining Facility	1. Transported A-Ration 2. Bag Lunch	
	Number of Personnel Per Shift					
	Security Police (SP)	19	N/A	N/A	N/A	Personnel declined our invitation to discuss the ground meal.
	Maintenance Personnel (MP)	N/A				
Flight Line	Shift Schedule	0700-1500 1500-2400 2400-0700				
	Current Meal Systems Provided	1. Bag Lunches 2. TV Dinners				1. Dining Facility
	Number of Personnel MP SP	N/A	120 Personnel/day	N/A	N/A	N/A
Missile Field	Shift Schedule		16 Hours/day dispatched at various hours and unscheduled times also			
	Current Meal Systems Provided		1. Bag Lunches			
	Average Number of Meals Taken	84 Meals/day	100 meals/day	83 meals/day	83 Meals/day	15 meals/day

*Represents total SP strength. Food Service unable to supply breakdown/shift.

TABLE 1. Breakdown of Personnel Characteristics by Bases Surveyed (cont'd)

Duty Locations / Personnel Types		Grand Forks	Fairchild	Whiteman	Wurtsmuth
Weapons Storage Area	Number of Security Police/Shift	22	19	18	20
	Shift Schedule of Security Police	0100-1500 1500-2400 2400-0700	0700-1500 1500-2300 2300-0700	0630-1430 1430-2230 2230-0630	0700-1500 1500-2400 2400-0700
	Current Meal Systems Provided	1. Bag Lunches 2. TV Dinners	1. Bag Lunches 2. Survival School Dining Facility	1. Transported A-Rations 2. Bag Lunches	1. Alert D. F. 2. Transported A-Rations 3. Bag Lunches
	Number of Personnel Per Shift				
	Security Police (SP)	15	26,	N/A	15
	Maintenance Personnel (MP)	N/A	250, 200, 45		135, 200, 200
Flight Line	Shift Schedule	0700-1500 1500-2300 2300-0700	0700-1500 1500-2300 2300-0700		0700-1500 1500-2400 2400-0700
	Current Meal Systems Provided	1. Alert Dining Facility 2. Bag Lunches	1. Alert Dining Facility 2. Bag Lunches		1. Alert Dining Facility 2. Bag Lunches 3. Vending Machines
	Number of Personnel MP SP	70 personnel/day	N/A	120 personnel/day	N/A
Missile Field	Shift Schedule	12-16 hours		12- 16 hours	
	Current Meal Systems Provided			1. Bag Lunches 2. MCI Supplement	
	Average Number of Meals Taken	71 meals/day	131 meals/day	25 meals/day	50 meals/day

TABLE 2. Reasons Preventing Meal Attendance

Duty Location	Reason	
	Security Personnel (SP)	Maintenance Personnel
Flight Line	- inability to be relieved due to 15/5* response time and limited manpower -scheduled at night after facility closed	- less manpower/increased workload during night shift - scheduled hours incompatible with hours of dining facility
Missile Field	- SP are dispatched along with the missile maintenance personnel and are subject to the same conditions	- dispatched for up to 16 hours to locations 150 miles from base
Weapons Storage Area (WSA)	- inability to be relieved due to 15/5* response time and limited manpower - distance from WSA to main base	

*15/5: a duty constraint requiring personnel to be within 5 minutes of duty post at all times

Security Police and Maintenance Personnel Duty Requirements. Maintenance personnel dispatched to the missile field perform both periodic and unscheduled maintenance tasks on the missile launching facilities. Security police accompany the maintenance personnel to perform security functions while the launching facility is otherwise unsecured. Crews consist of approximately three maintenance personnel and two security police.

The shift length and number of crews dispatched vary according to the projected workload in the missile field. If conditions require crews to continue to work more than 16 hours, crews remain overnight at a launch control facility (LCF) and continue work the next day. While at the LCF, dinner and breakfast are provided. But when personnel return to the missile field, after breakfast at the LCF, they do not obtain subsistence until they return to the main base.

The average daily number of missile maintenance personnel dispatched to the missile field is 155, accompanied by 53 security police. These numbers represent data collected over a two-week period at Minot AFB. The maintenance workload is subject to additional tasks, unpredictable events or a decrease in assignments which affect the average figures presented.

On-duty security police in the Weapons Storage area and alert aircraft parking area of the flight line number approximately 20 per shift at each location. Security police perform security functions and are subject to a 15/5 response time.* The work shifts are 0700-1500 (day shift), 1500-2300 (swing shift), and 2300-0700 (midnight shift), seven days a week. Security police are scheduled six days on, three days off. Meals are required during all shifts. Two of the nine bases visited did not have security police data that conformed to the above pattern. Holloman AFB has no WSA; consequently, there are fewer security police and one less location where meals away from the dining facility are required. At Nellis Air Force Base, there were 42 security personnel per shift; therefore, the requirement for meals away from the dining facility was greater.

Maintenance personnel on the flight line average approximately 200 during the day shift, 200 during the swing shift, and 122 during the midnight shift. Workload during the swing and midnight shifts is heavy because aircraft maintenance is performed after daytime flying. This workload was primarily the case at two Strategic Air Command (SAC) bases, Wurtsmuth and Fairchild. Differing missions at Tactical Air Command (TAC) bases will alter the figures presented here. For the most part, personnel during the day shift can be relieved so that they may obtain meals at the dining facility. The swing and midnight shift personnel are generally not afforded the opportunity to use the dining facility; therefore, they have a greater requirement for on-site ground meals.

Table 3 summarizes the average daily number of personnel from the bases where they were found.

TABLE 3. Average Daily Number of Personnel at Various Duty Locations

Duty Location	Security Police	Maintenance Personnel
WSA	60**	
Missile Field	55	115
Flight Line	55**	525

**Security Police in both the Flight Line and WSA have full duty strength 7 days a week. All other personnel are on skeleton shifts on weekends.

* A duty constraint requiring personnel to be within five minutes of duty post at all times.

Meal Types

The current ground feeding system has a variety of meal types to satisfy the needs of the customers. Bag lunches, commercial, complete frozen meals (TV dinners), A-rations and foil packs are the types of meals offered at the nine bases visited. A-rations are meals that consist of components similar to what is offered in the dining facility. Foil packs are a meal system of individually cooked and frozen components, designed primarily for use at the Launch Control Facilities (LCFs) at missile bases. Bag lunches are offered at all nine bases and were available to any personnel requiring a ground meal.

Bag Lunches. Bag lunches are the most popular method for providing food service to personnel requiring meals away from the dining facility. This is partly due to the fact that AFR 146-15 specifies the use of this particular type of meal to satisfy personnel meal requirements. Because many components of the bag lunch are commercially prepackaged items, the meals are prepared in advance and require only one person to distribute them. Bag lunches are also the easiest and most convenient means for providing food service to personnel.

The bag lunch typically consists of two sandwiches or fried chicken, condiments, dessert, and a beverage. Figure 1 depicts a bag lunch typical of what might be ordered at the bases visited. Appendix B contains three menus representing all nine bases surveyed. At these bases, one to 15 menu choices are available each day. Generally, these menus do not change from one day to the next - the same 15 choices appear every day. Within these selections, the same assortment of sandwiches is offered. The only variation in these menus are different desserts or beverages. When five or fewer menu selections are available daily, the menu is rotated on a weekly basis. But the actual selection of sandwiches is the same within the rotation period. Therefore, it is not surprising, that customers at the bases surveyed often complained about the lack of variety in their meals.*

FIGURE 1. Typical Bag Lunch

Appendix C contains a compilation of all comments received at the bases surveyed.

Bag lunches are centrally prepared at the In-Flight Kitchen (IFK). Depending on the number of lunches prepared, some IFK operations are administered from the main dining facility. Preparation of the meal components is, at most, 24 hours in advance of their issuance. The only menu components that require preparation at the IFK are sandwiches and fried chicken since other components of the meal are prepackaged, commercially prepared items or fruit. The tight plastic wrap used to package sandwiches and fried chicken causes the sandwich ingredients to become "welded" together during refrigerated storage.

At some bases sandwiches are prepared to order, and the entire meal is assembled with a minimum of 30 minutes to 2-hours notice. Because assembled meals are issued to customers in paper bags or cardboard boxes, the customer is prevented from viewing the meal before it is issued. Customers, for the most part, pick up their meals at the IFK. Multiple meal pickup is allowed.

Subsistence-in-kind (SIK) personnel use meal cards to obtain meals. Personnel receiving a basic allowance for subsistence (BAS) generally paid 40% of the Basic Daily Food Allowance (BDFA) for their meals. (BAS customers were allowed to choose from lower cost meals, 20% and 30% of the BDFA if they are offered at the base.) The cost of the meal is made up of the cost of all of the components of the meal, including commercially prepared items which are frequently used in bag lunches.

Individually packaged, commercially prepared items cost the customer more than if these items were prepared by base food service and purchased at the dining facility. The high cost of commercially prepared items is due to a number of factors. In addition to the cost of the ingredients, packaging, labor, and a profit margin contribute to the price. With food prepared by the dining facility, the only expense passed on to the customer is the cost of the food.

In Table 4 the price of a meal using menu items exclusively prepared at the dining facility is compared to the price of a bag lunch obtained from the IFK, including commercially prepared products.

TABLE 4. Cost Comparison--IFK Bag Lunch and Dining Facility Meal

Bag Lunch	Cost	Dining Facility Meal	Cost
Ham & Cheese Sandwich	$ .43	Ham & Cheese Sandwich	$ .43
Bologna & Cheese	.32	Bologna & Cheese	.32
Can of Soda	.17	Soda	.05
Hostess Pastry	.16	Piece of Cake	.10
Fruit	.13	Fruit	.13
Salad Dressing	.01	Mustard (less than $.01)	.00
Mustard	.02		
Chips	.16	Chips	.09
	$1.40		$1.12

Use of commercially prepared items in the bag lunch increases the cost of a similar meal at the dining facility by $.28 or 25%. These customers are not receiving the comparable value of eating in the dining facility but still are charged 40% of the BDFA. Customers of the bag lunch stated that the most popular meals were those offering the most food for the least cost, exemplifying that customers look for value in their meals. While the use of commercially prepared food provides an advantage to food service personnel in terms of convenience, recipients of the bag meal do not necessarily find the meal more acceptable with the addition of these items (see Appendix C).

Bag lunches were picked up by customers after placing an order no less than two hours in advance. Although a two-hour notice for meal pick up was convenient for food service, customers often found it difficult to predict if they would have a chance to eat. For example, at Nellis Air Force Base, personnel chose not to order a meal when they first arrived for their shift because they expected to be able to go the dining facility. When they realized later in the shift that they would be unable to go to the dining facility, the two-hour notice became unreasonable. Kirtland Air Force Base delivered bag lunches. At all other bases, customers picked up their meals individually or one person was designated to pick up meals for a group of individuals at one location. In the latter case paperwork and payment for the meals were collected before meal pick up.

Hot Meals. In addition to the bag lunches offered at all bases, some bases offer hot meals, i.e., A-ration/short order meals, TV dinners and foil packs. Hot meals were added to the ground feeding menu in response to customer request for an alternative to the bag meal. Figure 2 shows a typical A-ration meal. Police at both the WSA and alert aircraft parking area (flight line) were the only personnel given a choice among the bag lunch and any other alternatives.

FIGURE 2. Typical A-Ration Meal

The A-ration/short order meal consisted of an entree and any combination of starch, vegetable, salad, dessert, and beverage. Three to five choices of meals were available daily at the bases surveyed. The choices of meals were the same as those being served at the airmen's dining facility (ADF) and therefore were rotated in a similar manner. Other A-ration/short order menus consisted of a standard number of the same items offered everyday (see Appendix B for menus).

Bases using foil packs let customers choose from the entire foil pack menu. The menu consists of 32 items, broken down into the following categories: 5 vegetables, 5 starches, 5 desserts, and 17 entrees. Customers are able to select any combination of menu items to make up a complete meal.

Commercial frozen dinners consist of an entree, vegetable, starch and dessert. Five selections of meals were available at those bases offering TV dinners. In many cases, TV dinners were supplemented with bread and butter, condiments and beverage. The "Hungry Man" version of the commercial frozen dinners was used, thereby supplying larger portions of each of the menu components.

A-ration/short order meals are prepared in the airmen's dining facility or in-flight kitchen (IFK). When prepared at the ADF, the components of the meal are the same as what is offered from the serving line, so preparation was by food service personnel on duty in the dining facility. In contrast, A-ration meals prepared at the IFK consist of frozen foods or other convenience food items requiring little preparation time by IFK personnel. A-ration/short order meals are often reheated in a microwave oven before being consumed. However, because some meal items require less time to be heated than others, they may become overcooked or burned when the entire meal is reheated.

The preparation of commercial frozen dinners requires only heating the meal. Meal recipients either use a microwave oven at their duty location or heat the meal at the main base and transport it to the duty location. The dinner quality also suffers from uniform heating throughout, even though each component may require a different heat cycle. Commercial frozen dinners were issued from the IFK where an inventory is maintained.

Foil packs are similar to commercial frozen dinners in that preparation of a foil pack requires only heating. Meal recipients use a microwave oven for heating. Customers of foil packs and commercial frozen dinners not only have complained about the variety and quality of the meals, but also about the long period of time required to heat the meal, which leaves very little time to eat and relax.

An experiment conducted by NRDC[2] indicated that the time required for cooking two commercial frozen dinners in a Litton microwave oven was 9 minutes and 45 seconds. This would leave personnel relieved for 30 minutes approximately 20 minutes to eat and relax. However, if only one microwave oven is available at the duty location, any more than two customers would have little time to eat while on a half-hour break.

A-ration/short order meals were packaged in white foam compartmentalized containers or cardboard plates and placed in a paper bag. Plated meals are either stacked in boxes, put in commercial holding ovens or transported individually, as is. Cold A-ration meal components are packaged separately from hot components. When holding ovens were used to transport meals, the ovens often were heated to temperatures (200°F) well above what was needed to keep the food warm (140°F). This was because while being transported to the duty location, there was no power source to operate the oven and consequently the temperature of the oven dropped. Attempts to heat a cooked frozen dinner and hold it at a serving temperature of 170° for 6 to 8 hours were judged by an NRDC effort to be marginally acceptable due to the effect of time on sensory attributes.[3] In the same experiment, sandwiches accompanied by a soup or stew were held in appropriate temperature-maintaining food containers for six hours. The acceptability of these items was evaluated by the same panel evaluating the heated and held cooked frozen dinners. Most panelists stated they preferred these meals over the heat-held cooked frozen dinners. Additional comments were that soup and sandwich meals:

° offer flexibility because the whole meal does not have to be eaten all at once.

° maintain quality for a longer period of time.

° are practical as well as economical because less expensive equipment is needed if these meals are used.

Although commercial hot ovens are a widely used means of transporting plated food, their application in the Air Force ground operations is questionable. Holding ovens are ideally suited for situations where a power source is available for maintaining food temperature at 140° and where the amount of time between plating the food and consumption is minimized. Due to handling, (10 minutes) distance from kitchen to duty area (20 minutes), security checks (15 minutes), paperwork (15 minutes), and scheduling (relief of personnel to consume their meals) personnel are not able to consume their meals before the quality of the meal decreased.* In addition, plating food on a foam container before placing in a holding oven is not necessarily advantageous because foam starts to melt at 140°F, imparting an undesirable taste to the food contained therein (see Appendix C).

The price of the A-ration/short order, foil packs, and commercial frozen dinners ranges from $1.35 to $1.95 depending upon the base visited. With meals costing more than $1.35, SIK customers are issued a meal with a value greater than 40% of the BFDA, but BAS customers pay a price greater than 40% of the BDFA.

Hot Meal pick-up at each base except Kirtland (at which the Motor Pool delivered meals) is the responsibility of the group requiring the meal. In

* Data obtained from Kirtland AFB where actual time measurement occurred.

most cases, meals were picked up in bulk. The delicate nature of prepared hot foods, such as the food in A-ration meals, prohibits food service from being acceptable and satisfactory to meal recipients. Specific problems include:

- handling of the meal by 3 to 4 parties before the consumer (for example, cook, assembler of meals, transporter, shift leader).
- transporting meals over rough road conditions.
- long time between assembly of meals and consumption by customer.
- method of maintaining the temperature of the food i.e. heating of hot boxes, reheating in microwave.

Meal Supplements. In addition to the meals provided by base food service operations, personnel supplement their meals or obtain complete meals while on duty by means unrelated to the base food service. The following are examples of the alternative methods used by personnel to obtain meals:

- purchasing of food at convenience stores or fast food restaurants on the way to duty location;
- purchasing food at duty location from vending machines supported by the base exchange;
- delivery of pizzas by commercial restaurants to unrestricted areas of the base;
- preparation of meals at home and "brown bagging";
- use of the base exchange "Runnin' Chef" canteen trucks.

The SIK personnel using these methods to obtain meals are spending their own money to purchase food even though they are entitled to use base food service at no cost.

Summary Of Current Food Service Systems

Table 5 summarizes the systems currently used to provide food service to personnel groups at various duty locations. Security police at the WSA and flight line are provided with the greatest variety of meal systems and are generally given the opportunity to choose from a bag lunch or a "hot meal."

TABLE 5. Summary of Current Methods of Providing Food Service to Customer Groups at all Nine Bases

	Security Police	Maintenance Personnel
Flight Line	bag lunches foil packs TV dinners A-ration/short order dining facility	bag lunches dining facility
Missile Field	bag lunches	bag lunches
WSA	bag lunches foil packs TV dinners A-ration/short order dining facility	

Table 6 summarizes the feeding systems used to provide ground meals at each base visited. Analysis of the data in Table 6 reveals a pattern followed by bases offering or having offered security police a selection of meals. Initially, bag lunches are offered as the only choice; then perhaps due to customer criticism, food service offers a choice between bag lunches and a hot food option such as commercial frozen dinners or transported A-ration/short order meals, but customers eventually become dissatisfied with the new options given in lieu of the original option.

TABLE 6. Summary of Feeding Systems Utilized for Feeding Ground Personnel at Nine Air Force Bases

Base	before Oct 1981	as of Oct 1981
Kirtland	TV dinners bag lunches	bag lunches, A-rations
Whiteman	bag lunches	bag lunches, A-rations
Wurtsmuth	TV dinners bag lunches	bag lunches, A-rations
Grand Forks	bag lunches	bag lunches, Commercial Frozen Dinners
Loring	A-ration bag lunches	bag lunches, Commercial Frozen Dinners

TABLE 6. Summary of Feeding Systems Utilized for Feeding Ground Personnel at Nine Air Force Bases (cont'd)

Base	before Oct 1981	as of Oct 1981
Fairchild	TV dinners bag lunches	bag lunches, A-rations
Minot	bag lunches	foil packs, bag lunches
Holloman	bag lunches	bag lunches
Nellis	bag lunches	bag lunches

Kirtland AFB initially offered bag lunches; then, as a reaction to customer opinion tried to improve food service first by offering commercial frozen meals and then making A-rations available. When Kirtland was surveyed, it was reported that the security police were currently no more satisfied with the hot A-ration meals than with the commercial frozen meals and would like to have a serving line set up at WSA. When Grand Forks AFB was surveyed, it was making its first attempt to provide an alternative to the bag lunch by offering commercial frozen dinners to security police in the WSA and Alert Area. Security police at Grand Forks complained about the variety and quality of the commercial frozen dinners and instead wanted to have A-ration meals delivered to them. This reaction suggests that the level of satisfaction does not necessarily increase after instituting an alternative meal system. Most bases that have progressed through the different types of meal systems eventually find that the security police want their own serving line or to be able to go to the dining facility.

Although the inability of personnel to obtain meals at the dining facility is a significant problem, recent changes in the manning of Air Force units are worsening the already difficult task of relieving personnel to obtain meals. The net result is an increased dependence upon food systems designed to substitute for meals obtained from the dining facility. Recognition by the Air Force, of the extent that personnel must rely on the ground meal system, would be a significant step towards improving the food service system. If this were the case, the AF regulations governing the system would require modifications to address more adequately the food service needs of personnel. When considering the possible negative ramifications of poor morale resulting from unacceptable food service and its affect upon job performance, the issue of providing adequate and acceptable alternative food service becomes critical.

III ALTERNATIVE SYSTEM DESIGN PARAMETERS

Design of the alternative system was subject to a number of constraints established by the Air Force. In order of priority, these constraints were:

- food service staffing must be within the current operating levels;
- the system must be acceptable to the customers;
- minimal costs must be associated with the new system.

Food Service Staffing

Establishing a food service operation to prepare and serve meals to personnel at their duty location is a desirable option from the standpoint of customer convenience and high quality meals. The operation is, at least on the surface, a feasible option when the customer population is sufficiently large and when food service staffing levels are adequate to the requisite production levels. But not all groups have sufficient numbers to justify assignment of food service personnel. What then is the minimum size of the customer group needed to warrant the assignment of food service personnel in a stand-alone facility?

An estimate for this minimum customer group size was derived from food service productivity data gathered at Fairchild AFB and data gleaned from prior reports. The productivity level of food service staff preparing ground meals was 4.56 meals per man-hour at Fairchild AFB calculated using the following data.

- Average Ground Meals issued per day = 131.4
- Rank and number of staff assigned to the In-Flight Kitchen = E-6 (n=1), E-4 (n=1), E-3 (n=3)
- Staff duty hours per day = 8 hours
- Percentage of time spent on Ground Meal Preparation:

  E-6 = 40% = 3.2 hours

  E-4, E-3 = 80% = 25.6 hours

Given that a total of 28.8 labor hours were required to provide an average of 131.4 ground meals per day, the productivity rate is 4.56 meals per man-hour. This figure is consistent with meals/man-hour rates calculated from more extensive data.[4*]

In order to move from this productivity factor to an estimate of the minimum customer group needed to support a stand-alone food service operation, certain other assumptions and data need be considered. First, the length of hours of operation must be ascertained. Based upon the bases surveyed, three-shift duty schedules were a fairly frequent occurrence and are thus the basis upon which food service hours of operation is considered in this report.

One operating schedule that would accommodate three eight-hour duty schedule is as follows:

Duty Hours	Meal Hours
0700-1500	1100-1300
1500-2300	1800-2000
2300-0700	0200-0400

To provide meals at the hours specified above, an intermittent food service operating schedule would require 6 hours of operation - not including time before and after the meal for food preparation, setting a serving line and sanitation. Assuming that these activities would require an additional 4 hours (roughly 40 minutes both before and after the serving periods indicated above), a total of 10 hours of operation would be required.

Further, assuming that two food service personnel could handle the workload in a remote facility with a limited menu, then 20 man-hours of productive time is required. Added to this must be additional man-hours required for set-up, travel and administrative duties, which for the sake of this discussion are assumed to be 8 hours. Thus a total of 28 man-hours could be required to provide food service throughout a ten hour operation. Given the productivity rate of 4.56 meals/man hour, at least 128 meals would have to be served in order to warrant the assignment of two foodservice personnel.

Determinants Of Food Service Acceptability

Defining the "best" foodservice operation depends, in part, upon what consumer attributes and needs are to be accommodated. The following were identified as critical factors underlying customer satisfaction: food quality, convenience, variety, and dollar value.

* At Travis AFB the productivity level of the entire system was 4.29 meals per man-hour.

Food Quality. When customers rely on the same food service operation every day to provide meals, food service personnel need to expend effort to assure that high quality food is provided to the customer. A number of factors contribute to high quality food, including freshness and quality of the raw ingredients, proper preparation, palatability, and presentation.

Bag lunch customers complained that they were unable to determine, by taste or sight, which cold cuts were used in the sandwich.* In addition, foodservice personnel indicated at more than one base visited that Unsatisfactory Material Reports (form #DD 1608) had been filled out upon receipt of some cold cut products. Customers also complained of stale bread, soured milk, and of sandwich components being compressed into an inseparable mass. Even if the quality of the raw ingredients was excellent, improper preparation of the food product canceled the projected positive effect of the ingredients.

The quality of products prepared from high quality raw ingredients must be maintained until time of consumption. Proper packaging methods and material should be used if food cannot be consumed soon after preparation. In addition, if food is consumed long after preparation, menu items should be chosen on the basis of their ability to withstand being held until consumption.

Convenience. Specific convenience-related needs associated with each of the three groups of primary interest were identified and are described in Table 7.

* In 1981 data collected from dining hall patrons as part of the Consumer Level Quality Audit Program (COLEQUAP) indicated that the consumer ratings for bologna and salami were acceptable. The results for similar data if it were collected from ground meal patrons may differ due to the frequency with which ground meal sandwiches are consumed by personnel. AF Regulation 74-10 is the guidance for the COLEQUAP program.

TABLE 7. Specific Food Service Convenience Requirements

Duty Location	Requirements: Security Police	Requirements: Maintenance Personnel
Flight Line	System capable of being responsive to SP's inability to leave duty area, or post, limited time to consume meals	System capable of providing service despite the inability of personnel to predict when they will get a chance to eat
Missile Field	System that provides food that is easily eaten in a confined area	System that does not require personnel to eat at any particular time, and provides food easily eaten in a confined area
Weapons Storage Area (WSA)	System responsive to SP's limited time for meal consumption and the inability of personnel to leave duty area	

In addition to specific needs of each personnel group there are also needs applicable to all personnel, such as:

- one-stop service providing personnel all components of the meal and any other snack items desired;
- operating hours suitable to personnel work schedules;
- fast service;
- ability to provide meals without prior notice from customers;
- facility located close to all groups requiring services.

Variety. A frequent comment by customers regarding the current meal systems is that there is no variety in the meal selection. The elements of variety include both difference and choice. Methods of increasing variety are to:

- Rotate a cyclic, limited-choice menu over a period of time instead of retaining a repetitious, large menu;
- Work with the same raw ingredients to produce innovative variations on a basic menu item (for example, a turkey sandwich becomes a turkey club with bacon and tomato);

° Offer a la carte so that customers are not paying for items they don't want.

Value. Bag lunch customers frequently complained about the price and quantity of food in the meal. The price of the meal remains relatively fixed at all bases, approximately 40% of the BDFA. Included within the price of the meal is the cost of prepackaged, commercially prepared products. As described in Section II, the cost of these items is high in comparison to their cost if they were obtained at the dining facility. Therefore customers are not receiving the same value in terms of quantity of food as if they were eating at the dining facility. This loss is alleviated if the facility is given a greater allowance for the ground meal and customers are still charged the same price as an ADF meal, or if expensive commercial items are eliminated where possible and dining facility products substituted. In either case, customers would receive a greater quantity of food for the same price.

Cost Constraints

Currently meal costs are constrained to the Basic Daily Food Allowance except in special feeding situations such as flight feeding and feeding at launch control facilities (LCF), where the preparation facility receives an additional allowance above the BDFA for the meals. This additional allowance takes into consideration the uniqueness of the duties and inability of these groups to be serviced by conventional feeding methods. Ground meals are limited to at most 40% of the BDFA, the standard dinner meal allowance, but recipients are subject to some of the same constraints preventing them from obtaining food by conventional means. Therefore, it appears that ground meals should also receive an additional allowance.

IV. ALTERNATIVE SYSTEM CONCEPTS

Introduction

Three food service operations, each with differing menu, equipment, and concept of operation are proposed to reflect two basic system concepts. The satellite dining facility and the modular unit correspond to the concept of an on-site food service operation feeding fixed personnel groups with greater than 256 personnel per day at a duty location. The central deli operation corresponds to the concept of a food service outlet satisfying the needs of multiple groups with either fewer than 256 personnel and/or highly mobile personnel groups.

The three operations will be initially described as if they were stand-alone or separate options since there may be some situations in which one or the other would be best implemented as an independent operation. At most bases visited, however, there existed a need for both of the two concepts underlying the three types of outlets and after each is described, a section will be devoted to how these outlets could be efficiently interfaced with each other and an existing base main dining facility.

The Satellite Dining Facility. The satellite dining facility is an on-site food service operation incorporated into the hanger complex to service personnel numbering at least 85 per shift at their duty location. From the bases surveyed this corresponds to flight line maintenance crews. For example, at Wurtsmuth AFB there were 135, 200 and 200 personnel on duty on day, swing, and midnight shifts respectively. Personnel on the flight line require a food service operation that is especially responsive because maintenance personnel are unable to predict when they will have an opportunity to eat. The design of the satellite facility takes into account this factor by remaining open for three-five hours of an eight hour shift thus freeing personnel from the worry of when and how they will obtain a meal. These facts make the satellite dining facility convenient with respect to both time and location for personnel to obtain a meal.

Food items that can be prepared quickly as the customer waits were selected to be served at the satellite dining facility. Discussions with flight line maintenance personnel revealed that most customers chose to eat their meals when their maintenance tasks were completed so that they could eat and relax knowing that their work had been accomplished. Therefore, food items are prepared as ordered to maximize food quality rather than preparing food ahead of the three to five hour meal period and having it remain on the service line for that period of time.

Modular Unit. A modular unit would service customers with the same needs as a satellite dining facility, and represents an alternative approach for situations in which no building is available to house a food service operation. The modular unit is a freestanding unit.

Central Deli Operation. The central deli operation is a centrally located operation designed to service more than one personnel group. It is recommended for personnel groups with fewer than 85 personnel per shift or highly mobile groups whose duty prevents them from being able to predict their location within a shift period. From the bases surveyed this corresponds to missile maintenance personnel and security police at a Weapons Storage Area. Due to the nature of their duty, missile maintenance personnel must pick up their meals before departing to the missile field. This is because once in the missile field their distance from the main base makes it inconvenient to return and obtain a meal. Security police, although not always subject to the same constraint in terms of distance, may be subject to manpower shortages and scheduling problems which make it difficult to obtain a meal at any other time than before they depart to their duty area. In this case the hours of operation and location of the facility need to be consistent with the scheduled hours of the personnel it is servicing. With personnel picking up their meals before departing to their work area consideration is needed as to when these people will be consuming their meals. It is possible that personnel will be having their meals up to six hours after picking them up which requires careful consideration be given to menu items selected. The food items selected for the central deli operation, if properly packaged, maintain their quality up until the time for their consumption.

In addition to the three operations mentioned, another alternative may be applicable to some situations in the Air Force. A mobile food service van has been designed to feed personnel removed from Navy enlisted dining facilities. The van is recommended for small groups of personnel at fixed locations within an area small enough to be serviced within the time of a shift length. Personnel would have to be relieved when the unit arrived at their location on its schedule of stops.

SATELLITE DINING FACILITY

Menu. The menu at the satellite dining facility incorporates high preference items, requiring a minimum of preparation time and labor, such as hamburgers, hot dogs, fried chicken, and french fries. A choice of four to five entree items is available daily. Tables 8 and 9 present a suggested menu, with a recapitulation, which incorporates all items recommended to be served at the satellite dining facility. Hamburgers, hot dogs, chili, french fries, salad, and cole slaw are regular features on the serving line. One or two additional items, such as a fried chicken sandwich, or a shaved steak submarine sandwich are available daily, providing variety in the menu. Steamtable items are chosen for their ability to maintain their integrity for extended periods on the serving line. For example, soups and chili, due their recipe components, remain appetizing for extended periods.

Elementary marketing techniques can be used to enhance the perception of variety in the menu. For example, menu items can be grouped together as a theme. A combination Chinese plate, consisting of an egg roll, fried rice, and beef and vegetables can be offered as a special of the day. Another

technique to change regularly featured items is by adding a variety of toppings or changing the bread. A hamburger, for example, becomes an onion burger by smothering it with cooked onions and serving it on an onion roll.

Minimizing the total number of selections on the daily menu reduces the labor required for preparation, but by rotating menu items, acceptable variety is maintained.

Concept of Operation. A satellite dining facility would be open for two to three hours of an eight-hour work shift. This operating period can satisfy most requirements for meals away from the dining facility. An estimated one or two hours before and after the serving period are needed for food preparation, cleanup and accounting.

The service concept for the satellite dining facility is a take-out operation with limited seating. Disposable packaging is recommended for all items whether customers decide to return to their work area or eat at the facility. Disposables reduce the need for sanitation equipment and labor.

Most entree items are made to order. Desserts and salads are prepared and packaged individually at the main base dining facility for self service on the satellite serving line. Steamtable items are also prepared at the main dining facility and transported to the satellite dining facility to be reheated on the serving line. Steamtable items are served more quickly than a sandwich or fried items and are offered to aleviate backup on the grill and fryolator. The satellites submarine sandwiches are prepared by the central deli operation. Depending upon the main dining facility and central deli operation, preparation for some menu items served at the satellite facility is consistent with the concept of system interfacing for equipment labor savings.

The satellite operation should satisfy the majority of the customers within the flight line area because its immediate convenience, extended hours and take-out option permit customers to grab a bite as their maintenance workload permits.

TABLE 8. Suggested Menu Cycle and Menu Selections - Satellite Dining Facility

Day 1	Day 2
Hamburgers	Hamburgers
Cheeseburgers	Cheeseburgers
Hot Dogs	Hot Dogs
Fried Chicken	Chili
Fish Sandwich with Cheese	Fried Chicken Sandwich
French Fries	Onion Rings
Choice of Salads	Choice of Salads
Tomato Soup	Beef Vegetable Soup
Choice of Beverages	Choice of Beverages
Choice of Desserts	Choice of Desserts

Day 3

Hamburgers
Cheeseburgers
Hot Dogs
Shaved Steak Sandwich with choice of Eggs, Cheese, Onions, Peppers and Mushrooms
Fried Vegetables
Potato Salad
Chicken Noodle Soup
Choice of Beverages
Choice of Desserts

Day 4	Day 5
Hamburgers	Hamburgers
Cheeseburgers	Cheeseburgers
Hot Dogs	Hot Dogs
Tacos	Chinese Combination Plate
Burritos	Choice of Salads
Nachos	Beef Vegetable Soup
Tomato Soup	Choice of Beverages
Choice of Beverages	Choice of Dessert
Choice of Dessert	

TABLE 8. Suggested Menu Cycle and Menu Selections - Satellite Dining Facility (cont'd)

Day 6	Day 7
Cheeseburgers	Cheeseburgers
Hamburgers	Hamburgers
Hot Dogs	Hot Dogs
Western Sandwich	Chef Salad
Enchilada	Hot Meatball Sub
French Fries	Onion Rings
Clam Chowder	Chicken Noodle Soup
Choice of Salads	Choice of Salads
Choice of Beverages	Choice of Beverages
Choice of Dessert	Choice of Dessert

Day 8

Hamburger
Hot Dog
Tuna Submarine Sandwich
Pizza
Beef Vegetable Soup
Choice of Salad
Choice of Beverage
Choice of Dessert

TABLE 9. Suggested Menu Cycle and Menu Selections - Satellite Dining Facility - Recapitulation

Entrees	Side Orders
*Hamburgers	*French Fries
*Cheeseburgers	Onion Rings
*Hot Dogs	Fried Vegetables
*Chili	Nachos
Fried Chicken	
Fish Sandwich with cheese	
Pizza	
Fried Veal Sandwich with Tomato Sauce and Cheese	
Shaved Steak with	
eggs	
cheese	
onions	
peppers	
mushrooms	

TABLE 9. Suggested Menu Cycle and Menu Selections - Satellite Dining Facility - Recapitulation (cont'd)

Entrees (cont'd)

Tacos
Burritos
Enchilidas
Western Sandwich
Sub Sandwiches
    Tuna Salad
    Egg Salad
    Chicken Salad
    Ham Salad
    Italian Cold Cuts
    Roast Beef
    Ham
    Turkey
    Hot Meatball with Cheese
    Hot Sausage
Egg Roll
Fried Rice
Beef and Vegetables

Desserts

Cake
Pie
Cookies
Brownies
Fruit

Beverages

Soda
Milk
Hot Chocolate
Coffee
Tea
Iced Tea
Fruit Punch
Fruit Juice

Soups

Tomato
Clam Chowder
Beef Vegetable
Chicken Noodle

Salads

Tossed Salad
Macaroni Salad
Potato Salad
Chef Salad
Cole Slaw

* Designated as regular menu items

Layout and Equipment. Figure 3 presents an equipment layout, customer flow diagrams and equipment descriptions of the satellite dining facility. The dimensions of the facility shown in the figure are 12' by 24'. It should be pointed out that this is a general model - the layout of such a facility could be tailored to a specific base so long as the equipment, customer and work flows would approximate the suggested design.

Customers pick up their trays as they arrive to facilitate handling of all items for take-out and to allow cashiers to total easily the price of the meal. After placing an order with the food service personnel, customers serve themselves to soup, salads, beverages, and desserts from the upright refrigerated display case. Condiments and disposable flatware and take-out bags are obtained at the cashier station. The seating as shown accommodates 20 customers. Equipment descriptions are contained in Table 10. The total cost of the recommended equipment is $26,789.

Central Deli Operation

Menu. The food item selection for the central deli operation consists of both prepared foods and an assortment of components for sandwiches. These components include some items already in use at the AF base to prepare sandwiches, along with some new items. Table 11 presents the complete food item selection for the central deli operation. It is recommended that all items except the soup, stew or chili be offered daily. This allows customers to choose the bread fillings, condiments, salads, beverages and desserts that they want. Items such as salads, hot soups, a stew or chili, as well as desserts, beverages and chips to supplement the main sandwich offering are also included in the menu. The selection of all menu items is based upon their ability to retain their integrity given with a delay of several hours between preparation and consumption. Any hot items recommended were selected for their ability to stay appetizing for extended periods of time or to be reheated quickly and uniformly in a microwave oven. For example, heating chili or stew for extended periods will maintain or enhance the flavor of the product.

Customers are given a choice of components for their sandwich and also are able to select menu items that supplement the meal. Sandwich ideas should be advertised to induce the customers to try different component combinations, thereby heightening their perception of attractive choices. Figure 4 shows an assembled selection of menu items typical of what might be chosen by customers.

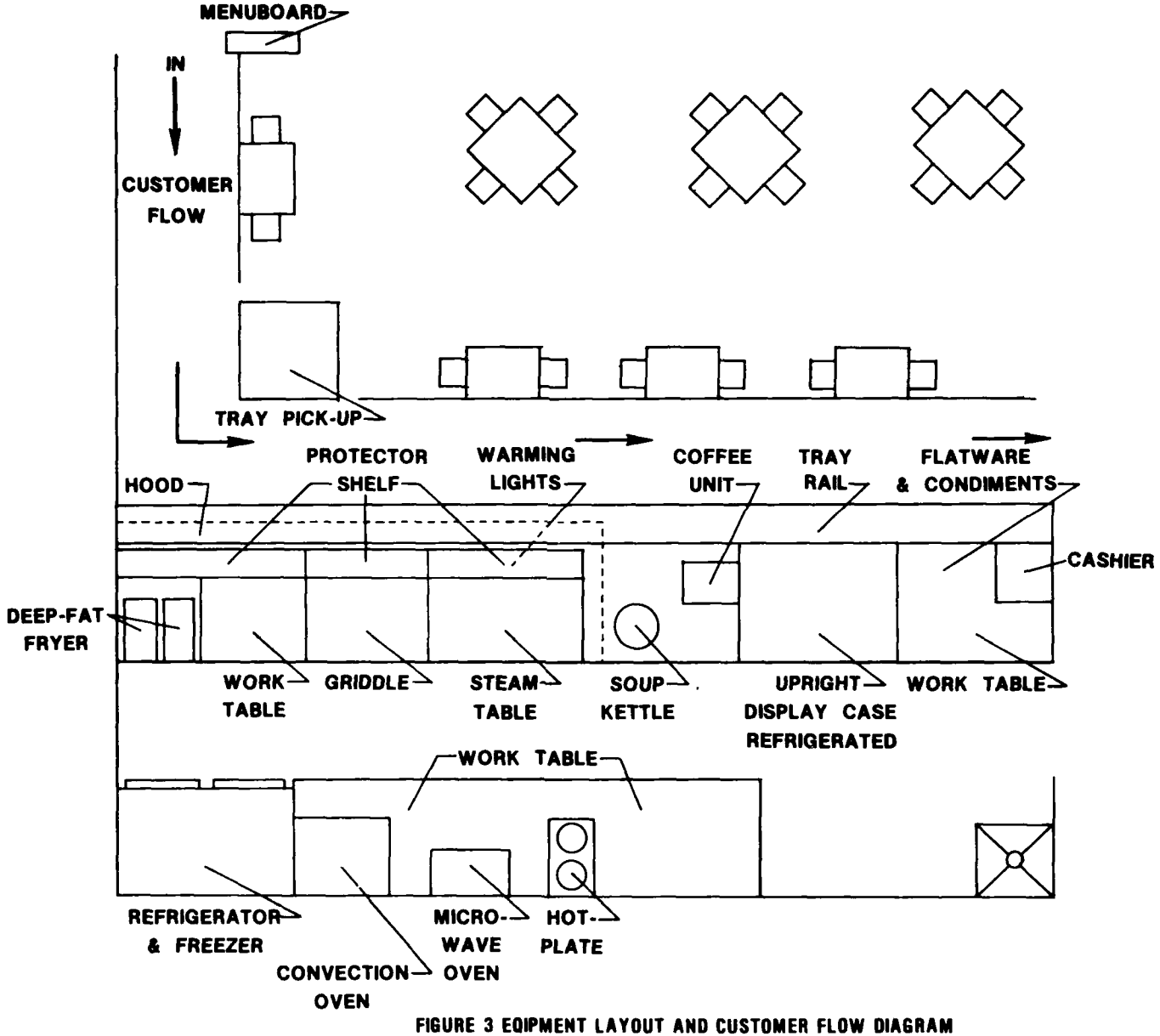

FIGURE 3 EQIPMENT LAYOUT AND CUSTOMER FLOW DIAGRAM OF THE SATELLITE DINING FACILITY

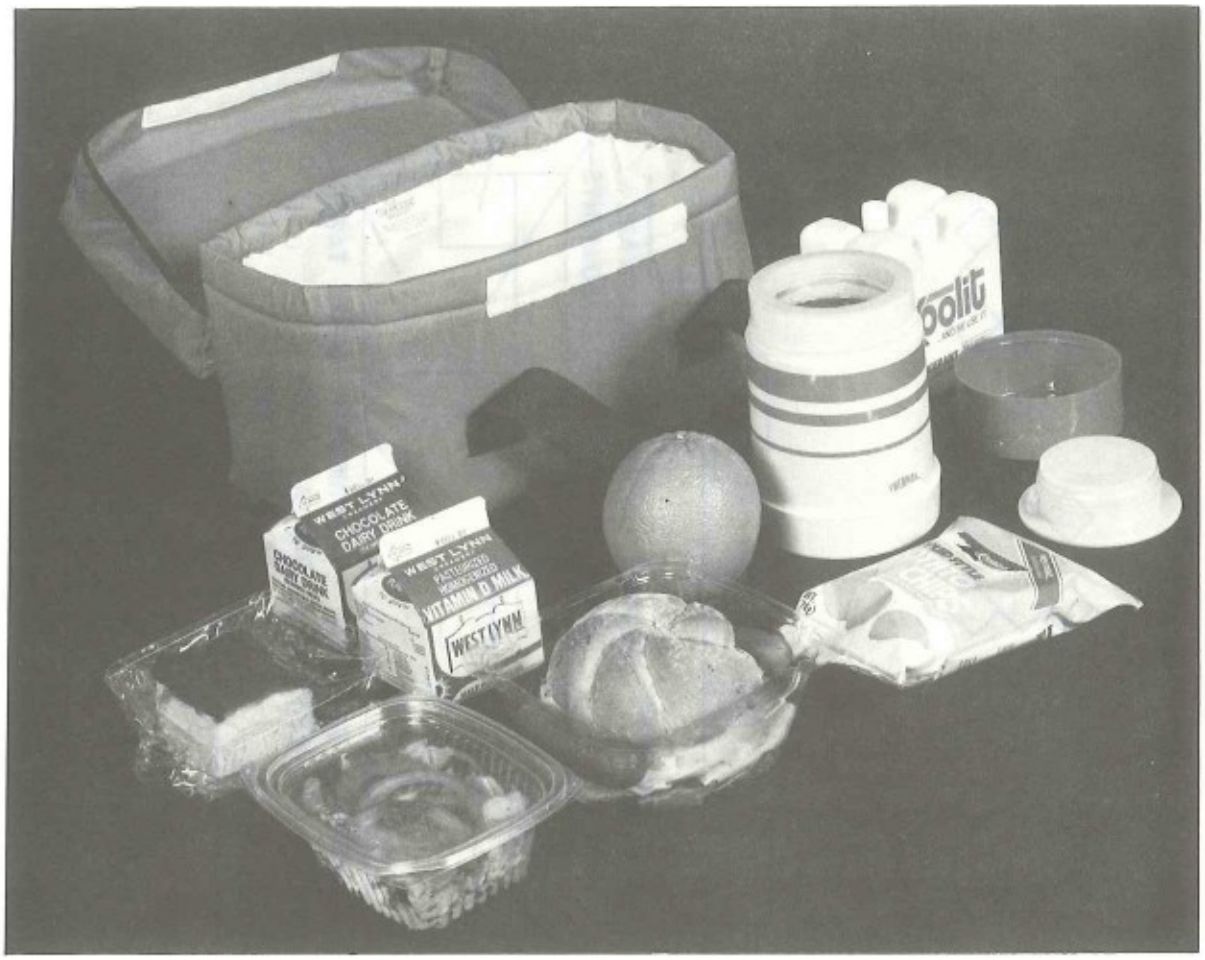

FIGURE 4. An Assembled Meal

The assortment of items at the central deli resembles a typical selection at a commercial delicatessen and is unlike any operation on Air Force bases included in the previously described survey. The uniqueness of the central deli would provide customers an alternative to conventional food service operations.

TABLE 10. Food Service Equipment - Satellite Dining Facility

N.	Item	Manufacturer	Model No.	Quantity Each	Unit Cost	National Stock Number	Federal / Military / Commercial
1.	Coffee Unit	Bunn-O-Matic Corp.	UL-15	1	150.00	7310-01-098-6478	W-C-500-Type I, Class II, Style A, Model S
2.	Convection Oven	Blodgett Co., Inc.	CTBR-1	1	883.00		MIL-O-43633
3.	Display Unit - Refrigerated Upright, Self-Contained	Bastian Blessing Food-service Equipment Co.	C48RR-X	1	4500.00		Commercial
4.	Fryer, Deep-Fat, Electric (Twin-Pot)	Hobart Food Service Co.	Ck-81	1	990.00		Commercial
5.	Griddle - Electric Free-Standing	Hobart Food Service Co.	CG-58	1	1274.00		MIL-G-2338-Type I, Size 2, Style 1
6.	Hot Plate, Electric (2 surface units)	Hobart Food Service Co.	CH-20	1	350.00		W-H-636-Type I, Style 2, Size 3
7.	Microwave Oven	Litton Microwave Cooking	80/40	1	742.00	7310-00634-1196	S-O-1425
8.	Protector Case - 3 Panels (2 stainless steel and 1-tempered) one piece full length serving shelf, 3 ft. heating unit under serving shelf above hot food table area	United Show Case Co.	405 S	1	800.00		Commercial
9.	Refrigerator/Freezer	Traulsen & Co., Inc.	RDT-2-32-N-UT	1	6250.00		Commercial
10.	Soup Kettle (12 Qt) Cast Aluminum	Tomilson Industries	2B-512-76	1	416.00		Commercial
11.	Table, Hot Food	Bastian Blessing	C 754 H8	1	2559.00		Commercial
12.	Hood-Length 12' x width 4'	Gaylord Industries	Model BD	1	5950.00		Commercial
13.	Work Table w/undershelf (size 30" x 96")	Metal Masters Food Service Equipment Co., Inc.	T 3096SE	2	809.00		MIL-T-2256-Type III, Size 2, Class 1, Grade A, Style 1
14.	Work Table w/undershelf (size 30" x 72")	Metal Masters Food Service Equipment Co., Inc.	T 3072SE	3	584.00		MIL-T-2256, Type III, Size 1, Class 1, Grade A, Style 1
15.	Work Table w/undershelf (size 24" x 24")	Metal Masters Food Service Equipment Co., Inc.	T 2424SE	1	384.00		Commercial

TABLE 11. Central Deli Food Item Selection

Roast Beef	White Bread	Milk
Turkey	Wheat Bread	Soda
Ham	Rye Bread	Iced Tea
Corned Beef	Pumpernickel Bread	Tea
Pastrami	Sesame Roll	Coffee
Bologna	Poppyseed Roll	Hot Chocolate
Salami	Onion Roll	Fruit Juices
Provolone	Water Roll	Fruit Punch
American Cheese	Sub Rolls	
Swiss Cheese	Tossed Salad	Mustard
Tuna Salad	Cole Slaw	Lettuce
Egg Salad	Potato Salad	Tomatoes
Chicken Salad	Macaroni Salad	Mayonnaise
Ham Salad	Potato Salad	Pickles
*Hot Sausage	Chef Salad	Dressings
*Hot Meatball with Cheese	Cake	Ketchup
Chili	Pie	
Beef Stew	Brownies	
Vegetable Beef Soup	Cookies	
Chicken Noodle Soup	Jello	
Tomato Soup	Pudding	
Clam Chowder	Chips	
	Pretzels	
	Tortilla Chips	
	Fritos	

* Hot sausage or meatball sandwiches will be issued as components. The hot components are placed in a thermos and the bread and cheese are issued separately, to be assembled at the time of consumption.

Concept of Operation. The proposed central deli is a take-out operation open 24 hours, at which customers can obtain their meals before dispatch to a duty area. Meals are made to order after a small inventory of prepared items is depleted, allowing customers to see what they are ordering and know their meal is freshly prepared.

Servicing customers with a made-to-order concept would alter the current food service staff schedule at the in-flight kitchen. The scheduling would be determined according to demand, as the made-to-order service method is more labor intensive during peak serving periods than current methods of providing meals.

Because the main dining facility prepares soups, chili, salads, and desserts for its customers on a regular basis, larger batches of these items could be prepared to accommodate both the dining facility and the central deli operation. Deli meats such as roast beef and turkey are cooked in the dining facility, cooled, and sliced just before meal service or as needed.

Customers are served by food service personnel behind a clear case displaying the menu components. A menu board listing all components of the meal is posted for review by the customers as they arrive and wait in line, and a blackboard publicizes daily specialty items. Customers decide what to order as they 1) review the choices on the menu board, 2) actually see items in the display case and 3) watch food service personnel prepare meals for other customers. In addition, customers are made aware of any changes in operation or menu at their duty location.

Cold sandwiches are made to order and packaged in rigid clear plastic containers. Assembly of cold sandwiches is such that the meat components, condiments, lettuce and tomato are separate from the bread. The components are placed on the bottom of the container and both slices of bread are on top. When the customer is ready to eat he simply removes the top slice of bread, inverts the container and places the bread slice on top of the open sandwich (Figure 5). The rigid plastic containers are large enough so that components can be loosely placed within it, ensuring that they will not be stuck together. If this is accomplished as specified, customers will perceive that their meal is freshly made.

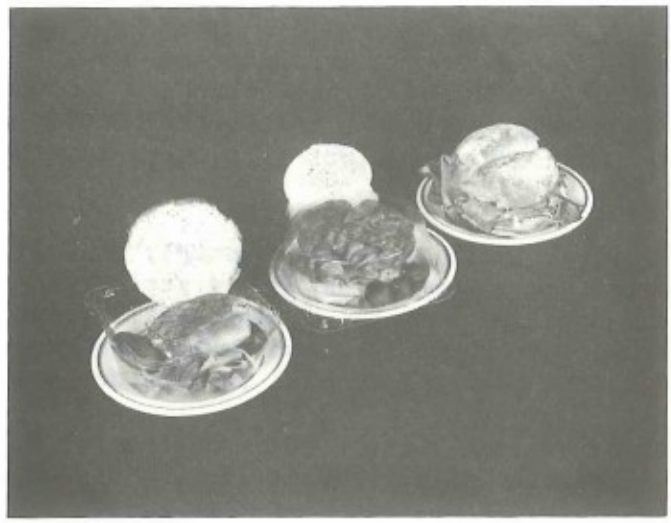

FIGURE 5. Sandwich Assembly

Very thin slicing of cold meat is recommended. Wafer-sliced meats more closely resemble the meats served by commercial deli operations. A sandwich made with very thinly sliced meat appears to have more meat than a sandwich prepared with equal portions of thickly sliced meat. It is recommended that cold cuts be sliced as needed or shortly before peak periods. Figure 6 demonstrates the visual difference between the traditional sandwich prepared for bag lunches and the sandwich recommended to be prepared under the new concept. Both sandwiches are prepared with the same portion sizes of sandwich meat but it appears that the sandwich on the left contains more filling. This visual effect is created by using the thinly sliced sandwich meat. Using a roll instead of plain bread and also the lettuce and tomato affects the appearance of the sandwich by making it more closely resemble a typical deli sandwich.

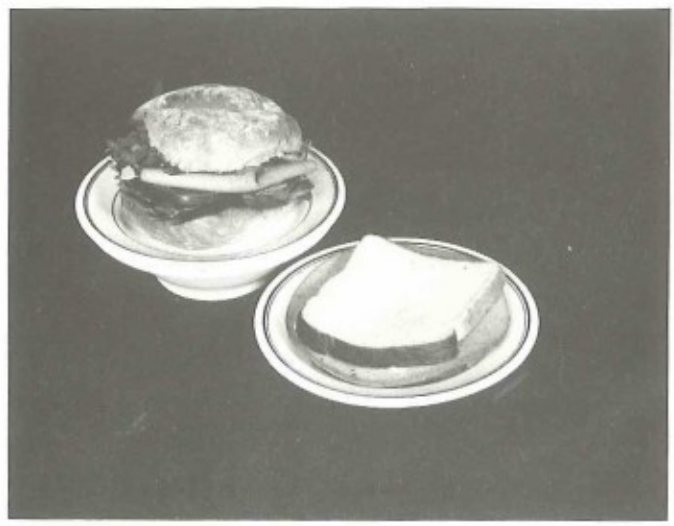

FIGURE 6. Comparison Between the Sandwiches Prepared Under Proposed and Old System

Hot subs (sausage and meatball) are packaged with the components separated. The customer assembles the sandwich when he is ready to consume the meal. Customers therefore not only avoid a soggy sandwich but also perceive that their sandwich is freshly prepared. Using this method, breads (with cheese if desired) are wrapped separately and hot components are placed in a thermos if no reheating capability exists at the duty location, or in an ovenproof paperboard container to be reheated later if the heating capability does exist. For example, security police at some WSAs have microwave ovens.

Hot soups, chili, or stew are held in thermos containers if personnel are unable to reheat them or in ovenproof paperboard containers and lids by those personnel with access to reheating equipment. Desserts are packaged in clear rigid plastic containers. Sandwiches and desserts are overwrapped by machine or by hand with clear, flexible plastic wrap. Tossed salads, cole slaw, and macaroni and potato salads are self-service. The recommended packaging for salads is clear plastic rigid container with a plastic lid. Potato chips, soda, milk and fruit juices are commercially packaged and are also self-served. Packaging recommendations are summarized for all systems in Appendix D. The entire meal is assembled and placed in a cooler or insulated bag with freezer packs to maintain the food at an appropriate temperature (see Figure 4). Descriptions and cost of a thermos, coolers/insulated bags and freezer packs are located in Appendix E. Figure 7 presents two typical coolers and freezer packs for use by personnel who lack means of refrigerating their meals until consumption. This aspect of the service concept is important not only from the point of view of product safety from spoilage but also in terms of customer acceptability. If personnel are dispatched as a team, larger coolers to hold all the meals taken might be considered. Those customers with access to refrigeration would not need to be issued a cooler. Figure 8 shows an assembled meal within the cooler.

The service concept is summarized in the following steps:

1. Customers place their order for sandwiches with the food service personnel.

2. Customers serve themselves to salads, desserts, beverage and chips.

3. Customers assemble their meal in their cooler or group cooler.

Layout and Equipment. A proposed equipment layout and customer flow diagram of the central deli operation is shown in Figure 9. Customers pick up their trays when they first arrive. Trays are picked up (despite the fact that the operation is take-out) so that the cashier can see what the customers have taken before the coolers are packed. Customers place their orders after viewing the contents of the deli case and then serve themselves any other meal components, including hot items held in a soup kettle. Food service personnel prepare the sandwiches on the work table behind the deli case, obtaining the meat from the deli case and any other sandwich fillings from the sandwich unit. The coffee unit is set up for customers to obtain a cup of coffee to go. Since many customers will be picking up their meals in the morning before

travelling to their duty location, the coffee is provided as an extra incentive to come to the operation and is not considered part of the meal that is being obtained for later consumption.* At this point customers pay for their meals and arrange the meals in their coolers. The dimensions of the proposed layout are 22' by 24'6".

Table 12 describes the equipment, prices, their manufacturer, model number, cost, and specification number where appropriate. This is a suggested layout and equipment list which may vary upon review of each base's current facilities and resource levels.

*Air Force Regulation 146-15, Para. 4-16c. specifies the issuance of bulk coffee to ground support personnel and at many of the bases visited coffee was given to personnel groups.

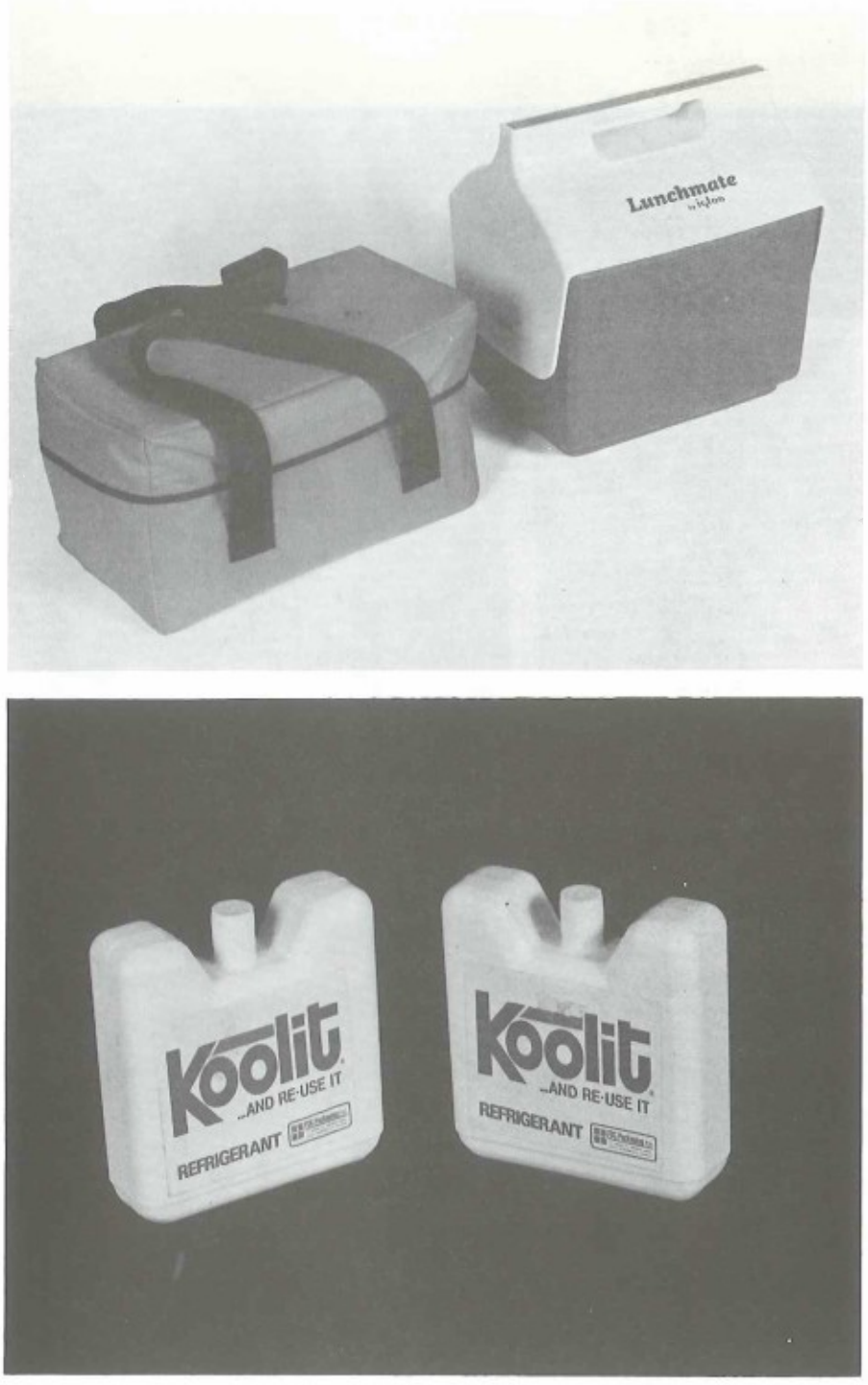

FIGURE 7. Recommended Coolers and Freezer Packs

FIGURE 8. Assembled Meal Within Cooler

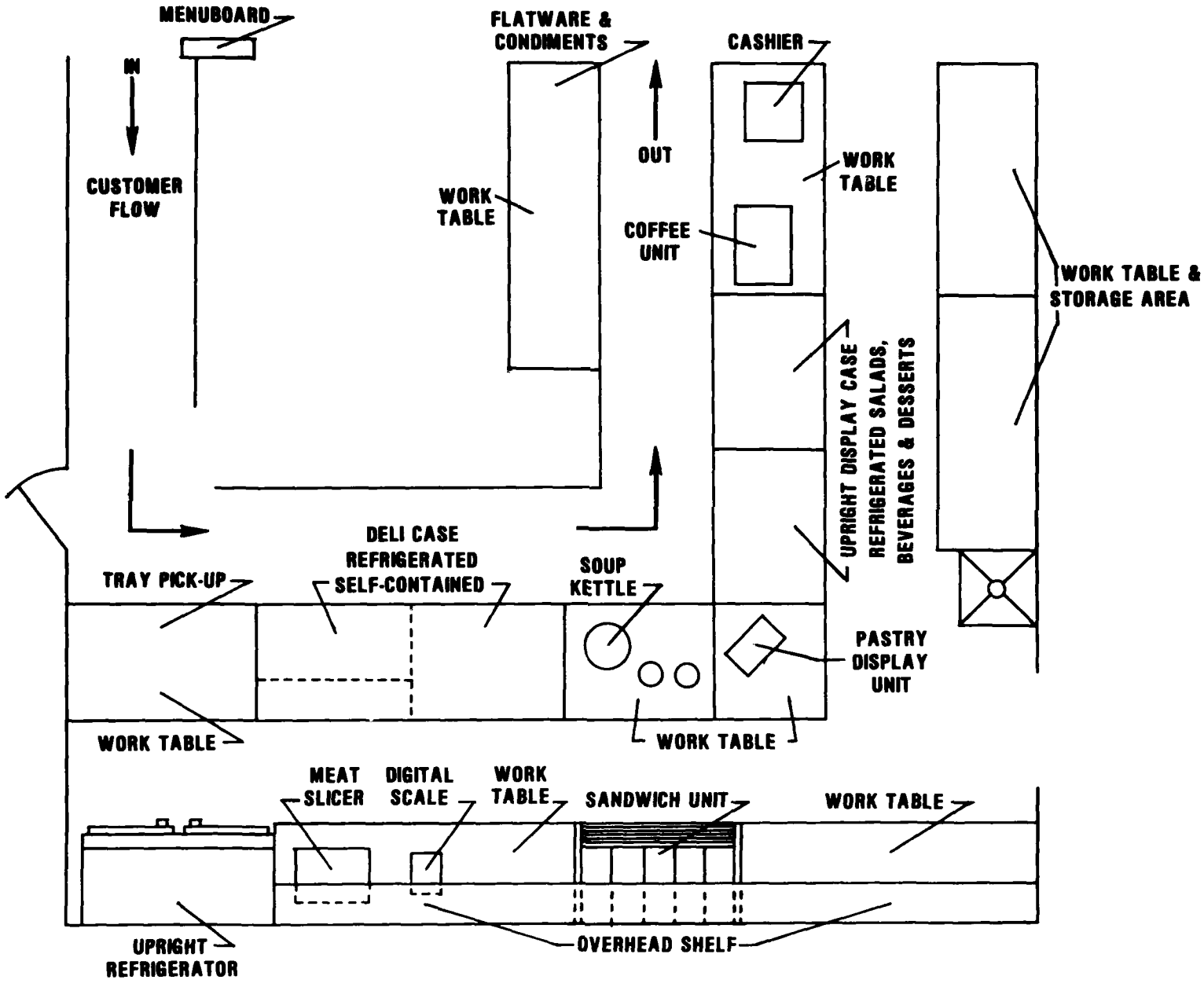

FIGURE 9 EQUIPMENT LAYOUT AND CUSTOMER FLOW
DIAGRAM OF CENTRAL DELI OPERATION

TABLE 12. Food Service Equipment - Central Deli Facility

N.	Item	Manufacturer	Model No.	Quantity Each	Unit Cost	National Stock Number	Federal Military	Federal Commercial
1.	Coffee Brewer (5-Pot)	Bunn-O-Matic Corp.	RL-35	1	500.00	7310-01-105-0427	C-500-Type I, Class 1, Style Model S	
2.	Deli Case Refrigerated Self-Contained	Hill Store Equipment Co.		1	4300.00			Commercial
3.	Meat Slicing Machine, Elect.	Hobart Food Service Co.	410	1	1000.00	7320-00-22204177	OO-M-280-Type II, Style, Size 2, Model ., Class 2	
4.	Merchandising Unit, Refrigerated Upright, Self-Contained	Bastian Blessing Food Service Equipment Co.	C48RRX	2	4500.00			Commercial
5.	Pastry Unit (1/4" Glass) Shelves	United Showcase	6032F		550.00			Commercial
6.	Refrigerator, Upright, Reach-In Self-Contained, Stainless Steel, (4 one half size doors)	Traulsen & Co., Inc.	RHT-2-32-N-UT	1	2000.00	4110-01-024-8991	A-R-200Type H, Style 1, Size 45	
7.	Sandwich Unit	Star Metal Corp.	RP 10-8	1	1125.00	7310-00-137-6340	MIL-S-43852-Style 2, Size 2	
8.	Scale Digital (11 oz) (Rectangular plate)	Ohaus Scale Corp.	C 300	1	395.00			Commercial
9.	Shelving	Metal Masters, Inc.	WS 1-96-16-3	2	350.00			Commercial
10.	Soup Kettle - Cast Aluminum Construction	Tomilson Industries	12 Qt (28-512-76)	1	416.00			Commercial
11.	Work Table (8')	Metal Masters, Inc.	T 3096SB	3	665.00			Commercial
12.	Work Table (6')	Metal Masters, Inc.	T 3072	2	425.00	7320-00-927-7462	MIL-T-2256-Type III, Size 1	

Modular Unit

Menu. A modular unit is designed as a fully functioning food service outlet, capable of providing complete meals without depending upon other operations for support. Limited space within a modular unit constrains the variety of menu items offered. All menu items and equipment necessary for their preparation, assembly, packaging, and storage as well as working space for the necessary number of personnel staffing the operation must fit within the restricted confines of the unit.

Like the menu for the satellite dining facility the food for the modular unit incorporates high preference items requiring minimum preparation (Table 13). Limited space constrains the menu to two or three main choices per meal. Of these, one item is featured and the other one or two are rotational specialty items of the day. Using this method, variety is introduced into the menu while assuring customers that there is at least one desirable choice they can count on. The feature item, hamburgers, is selected for its high preference and ease of preparation. In addition to hamburgers, a variety of sandwiches and other entrees make up the menu as well as salads, desserts, and beverages.

Concept of Operation. The modular unit is designed to be used in those cases where there is no available space or funds for a satellite dining facility. The concept of operation of a modular unit is the same as the satellite dining facility except at the variety of the menu may be more limited, because less space and equipment are available for food preparation. Also, the self-service concept of the satellite dining facility cannot be used with the modular unit because all components of the meal are assembled within the modular unit and distributed to customers from a take-out window.

At Ft. Ord, California a modular unit was installed to alleviate long customer lines at the adjacent dining facility. The lunch menu offered from the modular unit each day consisted of a cheeseburger or another special sandwich along with salad, potato chips, dessert, and assorted beverages and condiments. For dinner, fried chicken or another special sandwich and the same additional items were offered.

TABLE 13. Modular Unit Menu Components

Hot Dogs
Hamburgers
Cheeseburgers
Fried Chicken
Chicken Sandwich
Fish Sandwich
Sub Sandwich
 Tuna Sandwich
 Egg Salad
 Chicken Salad
 Ham Salad
 Italian Cold Cuts
 Roast Beef
 Ham
 Hot Sausage
 Hot Meatball with Cheese
Shaved Steak with
   Eggs
   Cheese
   Onions
   Peppers
   Mushrooms

Chips
Tortilla Chips
Pretzels
Fritos
Soda
Milk
Fruit Juices
Fruit Punch
Iced Tea
Tea
Coffee
Hot Chocolate
Cake
Brownies
Puddings
Jello
Pie
Cookies
Cole Slaw
Macaroni Salad
Potato Salad
Tossed Salad
Fruit
Condiments

Equipment and Layout. The equipment layout for the modular unit in Figure 10 is based upon the design of the fast service concept at Fort Ord, California.[5] The modular unit contains only the equipment necessary for food preparation (Table 14). Customers are served at the two windows. The dimensions of the facility are 24' (length) x 10' (width) x 12' (height). Tables outside of the unit can be set up to provide customers a place to sit and eat their meal. Otherwise, personnel would return to their duty area to consume their meals.

Navy Mobile Food Service Van

The Navy's mobile food service van, as it was proposed for use at Naval Station, Norfolk, Virginia, has the capability of providing meals to 400 personnel without depending upon base food service for resupply or food preparation. Figure 11 shows the layout of the van used at Norfolk and Table 15 lists the installed equipment.

The van provides food service to students at the Fire Fighting School. Because the school is located away from base food service activities, all personnel obtain their meals from the van. From 100 to 400 meals are served daily from the van between 1100 and 1300 hours.

The menu served from the van includes hamburgers, cheeseburgers, submarine sandwiches, a hot entree, french fries, milk, soda, assorted fruit drinks, and pastries. The van has the capability of serving a full A-ration menu. Preparation of the menu requires three food service personnel. Limited space and equipment constrains the number of personnel preparing food in the van and restricts the variety of the menu that can be prepared.

The mobile food service van at Norfolk, VA is being leased for a period of one year for the cost of $52,020. The estimated yearly cost of fuel and maintenance is approximately $1120. At the termination of the lease period the Navy will be given the option to buy the van for $2850.

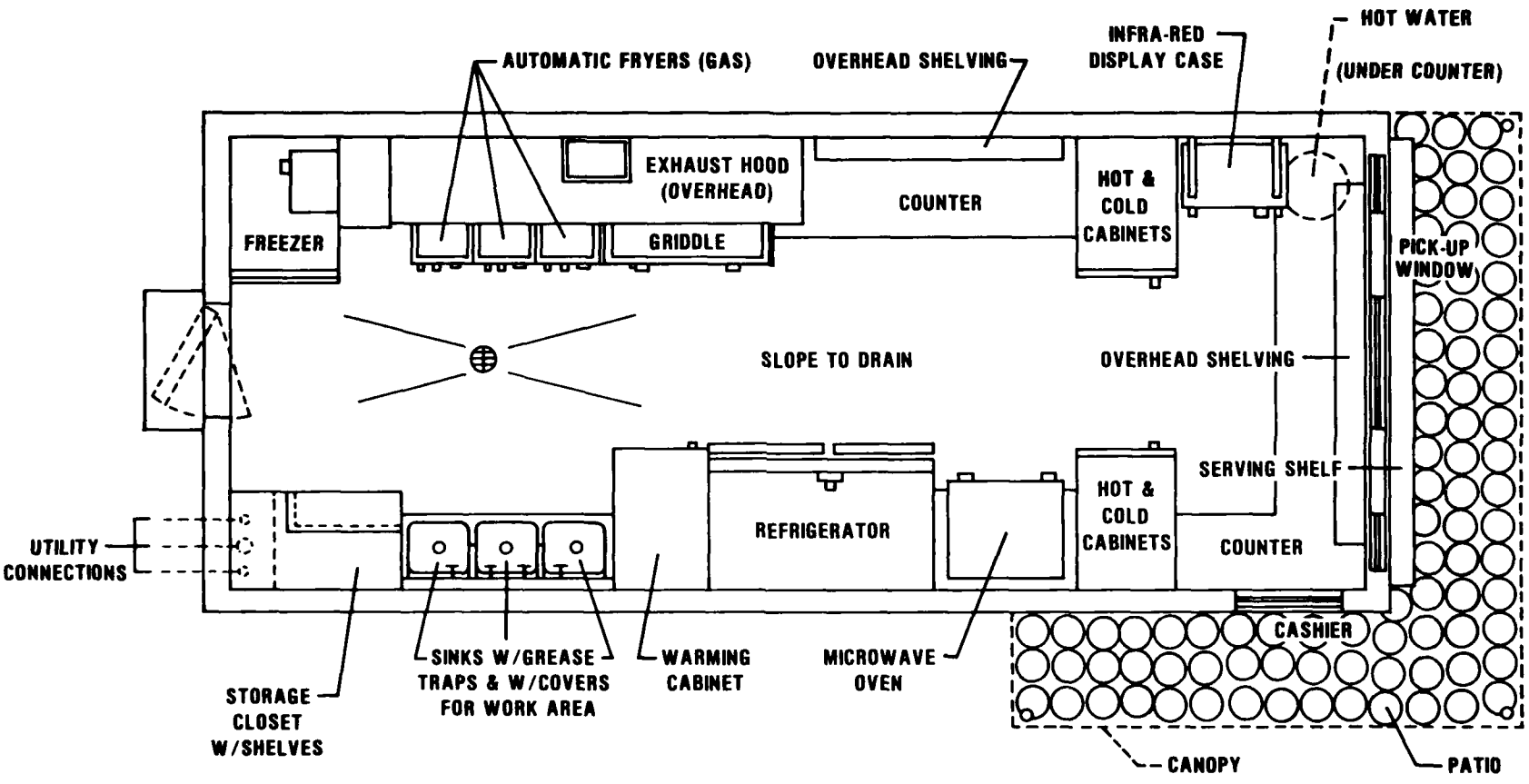

FIGURE 10 EQUIPMENT LAYOUT OF MODULAR UNIT

TABLE 14. Food Service Equipment - Modular Unit

N.	Item	Manufacturer	Model No.	Quantity (Total)	Unit Cost ($)	National Stock Number	Specification Federal, Military Commercial
1.	Cabinet, Warming	Cresent Metal Products, Inc.	H-137-CDD-UA-12	1	$1330	NA	W-C-20
2.	Cabinet, Food (Hot & Cold)	Cresent Metal Products,					
	a. Hot Unit	Inc.	H-339-128	2	620	NA	Commercial
	b. Cold Unit		309-128	2	532	NA	Commercial
3.	Food Warmer Infra-Red	Cresent Metal Products, Inc.	H-831-24-2	1	580	NA	Commercial
4.	Freezer, Upright, Reach-In Self-Contained, Stainless Steel	Traulsen & Co., Inc.	RLT-1-32-W-UT	1	910	4110-01-024-8990	MIL-F-43408-Grade A
5.	Refrigerator, Upright Reach-In Self-Contained Stainless Steel, (4 one-half size doors)	Traulsen & Co., Inc.	RHT-2-32-N-UT	1	500	4110-01-007-8152	AA-R-200-Type H, Size
6.	Fryers, Deep-Fat	The Frymaster Corp.	MJ-35SC	3	437	7310-01-006-4452	S-F-700-Type 1, Size 4, Model A, Grade A, Class 1
7.	Griddle, Gas	Keating of Chicago, Inc.	Miraclean-Size 48	1	475	NA	MIL-G-2239-mira-clean Surface 160,000 BTLC
8.	Microwave Oven	Litton Industries	80/80	1	140	NA	S-O-1425-Type II, Size 1200 Group 1, Class 2, Style 3
9.	Sink, 3-Compartment w/covers to convert to work area	Metal Masters, Inc.	1848-3	1	655	NA	Commercial
10.	Refrigerator, Portable Walk-In Type (box only)		150 cu. ft. capacity	1	80	4110-00-057-0325	MIL-R-12571
11.	Freezer Portable Walk-In Type (box only)		150 cu. ft. capacity	1	80	4110-00-057-0325	MIL-R-12571
12.	Refrigeration Unit Electric Motor Driven		Air Cooled	2	70	4110-00-057-0332	MIL-R-12574-Type II

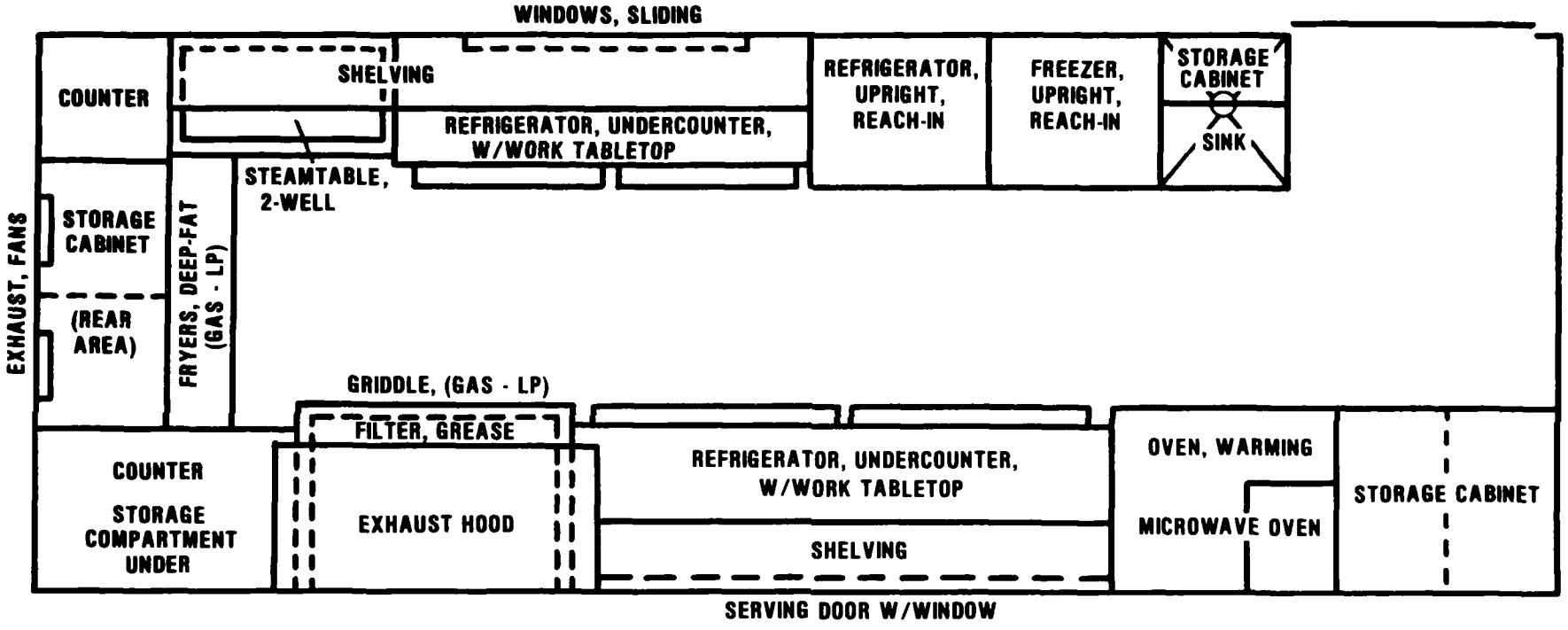

FIGURE 11 EQUIPMENT LAYOUT OF MOBILE FOODSERVICE VAN

TABLE 15. Food Service Equipment Installed in the Mobile Food Service Van at Naval Base, Norfolk, Virginia

1. Freezer, upright 2-door, reach-in type.
2. Refrigerator, upright 2-door, reach-in type.
3. Refrigerator, under counter, with work table two, 2 each.
4. Steamtable, double well.
5. Fryers, deep-fat, 2 each.
6. Filter, fat.
7. Warming cabinet.
8. Griddle.
9. Microwave Oven, heavy duty.
0. Food warmer, with infrared heating elements.
1. Hood, exhaust.
2. Sink, hand with storage compartment below.
3. Storage, dry, upright.
4. Storage, dry with sliding glass door.

Summary of Menu Concepts

Appendix F summarizes food items offered at the modular unit, satellite dining facility and central deli operation and their associated production costs. Analysis of the Appendix F indicates an overlap of menu items between the three operations. Even though some entree items vary from one operation to another, salads, beverages, and desserts are the same. The choice of menu items for any one facility is dependent upon their ability to withstand being held for specific time periods. For example, short order items, (hamburgers and fried chicken) are recommended for the satellite dining facility and modular unit. Because these items are prepared to order, they do not lend themselves to the central deli concept in which foods are consumed hours after preparation.

Under an a la carte system BAS customers are charged a separate price for each item they select from the menu. It is recommended for entree items (because their costs vary the most), that a single average price or weighted average price be charged to customers for any entree item they select. This average pricing is recommended to prevent customers from always selecting lower priced items which frequently they prefer less than other items from a large selection of menu items. When customers always choose lower priced items they eventually perceive that their menu choices are much narrower than they actually are and this leads to complaints by customers of a lack of variety in the menu. This appeared to be true of customers served by the F.E. Warren foil pack system. Appendix H summarizes cost, preference and frequency of consumption data for the entrees of the foil pack system consumed over a one-week period. As noted from Appendix H, fried fish, which has a preference rank of 13 out of 16 but the lowest price of all the entrees, was most frequently consumed. Also, swiss steak which has a preference rank of 5 out of 16 and the highest price, was consumed the least.

Cost per serving data was obtained from the RAMPS computer printout, Federal Stock Catalog Group 89, supply centers at military bases and commercial suppliers. Appendix G presents the cost of typical meals from each of the three operations.

Items in the menu that may be prepared at one location and distributed to the other locations: Currently the operations of the in-flight kitchen, including the preparation of ground feeding meals are separate from all base food service operations. The method recommended in this report, called "system interfacing," makes better use of food service staff and minimizes the need to acquire special equipment for preparation of menu items. Figure 12 schematically depicts the flow of menu items from the food service operations. As noted from Figure 12, the dining facility will prepare most items under this system because it already has the equipment and staff available for preparation of the items listed. The central deli operation will support the modular unit and satellite dining facility with submarine sandwich components. Although there is an overlap of beverages, chips, and condiments between all facilities, these are commercially prepared and packaged items.

The cost of transporting the food from the main preparation site to the operation where it will be served must be considered. Both the cost of the vehicle and driver are considered. One round trip daily is required to each facility. Based on actual distances calculated at Nellis AFB, four miles of transport are required daily. This requires approximately one half an hour of cook labor at $8.60/hour for an E-5 for a total cost of $4.30 daily. The allowance for gas and maintenance is $ .44/mile for a 2½ ton truck for a total of $1.76 daily. Therefore, the cost of transporting the food daily is $6.06, and $2122 yearly. Obviously, this method is less costly than purchasing the necessary equipment to produce menu items and providing additional staff to prepare food items at each facility. For example, the cost of a single refrigerated display unit alone is $4500 (Table 10).

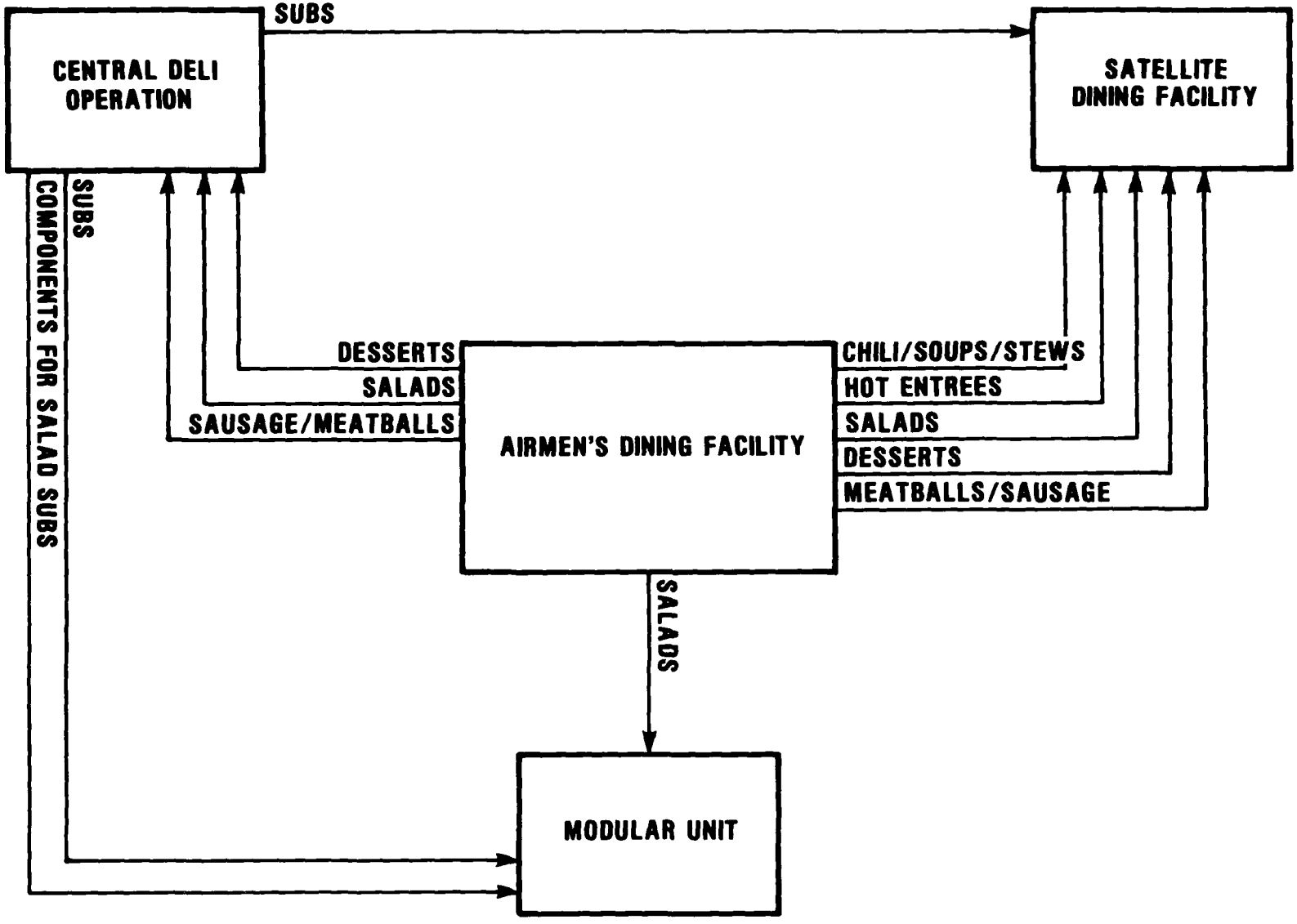

FIGURE 12 SYSTEM INTERFACING

V. CONCLUSIONS AND RECOMMENDATIONS

This analysis of the current methods of providing meals to personnel away from the dining facility yielded the following conclusions.

1. Bag lunches, currently the most popular means of providing food service, are unacceptable to customers in terms of food quality, perceived value and variety.

2. The adoption of alternative methods to the bag lunch in response to customer requests has not increased the acceptance of meals obtained away from the dining facility.

The following recommendations are made.

a. A central deli operation, as described before, is recommended for fixed groups with fewer than 85 personnel per shift and mobile groups with greater than 85 personnel per shift. This number per shift corresponds to maintenance and security personnel working in the missile field and security police at the Weapons Storage Area and Alert Aircraft Parking Area at the bases visited.

b. A Satellite dining facility or modular unit, as previously described, is recommended for fixed personnel groups with greater than 85 personnel per shift. This corresponds to maintenance personnel within the flight line area at the bases visited.

VI. LIST OF REFERENCES

1. Air Force Regulation 146-15, Flight Feeding, 19 November 1981.

2. Unpublished Manuscript, Food Engineering Laboratory Support to MSR-USAF 83-7, 18 February 1982.

3. B.A. Davis, and Mary V. Klicka, Effect of Holding Time and Temperature on the Quality of Precooked Frozen Meals, NATICK/TR 82/045, U.S. Army Natick Research and Development Center, 1982 (AD A129 827).

4. Gerald Hertweck and Ron Bustead, An Evaluation of Air Force Food Service Operations at Travis AFB, Natick TR/75-34 OR/SA June 1974 (AD A007124).

5. B.M. Hill, M. Ostrowsky, J.B. Ahern and George Turk, A Fast Service Concept Utilizing a Modular Food Facility, NATICK/TR-82/038, U.S. Army Natick Research and Development Center, 1982.

This document reports research undertaken at the U.S. Army Natick Research and Development Command and has been assigned No. NATICK/TR-84/033 in the series of reports approved for publication.

APPENDIXES

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APPENDIX A. Standard Data Collection Forms

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Appendix A. Standard Data Collection Forms

SURVEY OF GROUND FEEDING MEALS & GROUND PERSONNEL

IN-FLIGHT KITCHEN DATA to be filled out by the foodservice representative most capable of answering the questions

a. Types of ground meals issued from the In-Flight Kitchen (IFK) i.e., bag lunches, TV dinners, snack meals

	Types	Number of Selections/Days	Rotation of Menu
1.			
2.			
3.			
4.			
5.			

(If possible please include copy of menus)

b. During the period of _____ to _____the total number of meals issued by the the IFK was _____.

(a typical two week period)

c. The number of meals issued of each type during the same period as above was:

1.
2.
3.
4.
5.

d. Considering only meals issued for ground personnel, how many of each type of meal was given to each squadron of ground personnel for same time period?

Squadron	Type of Meal and	Number of Meals
1.	1.	1.
	2.	2.
	3.	3.
	4.	4.
2.	1.	1.
	2.	2.
	3.	3.
	4.	4.

e. How was IFK staffed during this period? Number of personnel _____/day.

Breakdown by duty	Hours/day	Approximate % of time spent on ground meal duties
1.		
2.		
3.		

f. Are meals prepared to order? If not, is the complete meal assembled in advance or are set-ups used?

g. If meals are not prepared to order how far in advance of their issuance are they prepared?

h. Are the components of the meals (i.e. sandwiches, chicken) prepared to order or prepared beforehand? If prepared beforehand how far in advance?

i. (a) How are the components of the meal packaged?

(b) How is the assembled meal packaged?

j. What is the price of the meal(s)? Do you have a la carte system for ground meals?

k. How is the meal price determined?

l. Are commercially prepared or individually packaged items included in the meal? Please list. What is their cost? (i.e., milk, chips, snacks, condiments).

m. How convenient is the IFK to all ground support crews requiring its services?

n. Please include 6 months copies of AF Forms 467 and 249.

Base Foodservice Data (to be completed by the foodservice personnel most capable of answering questions)

a. List all appropriated foodservice operations (stand-by or permanent)

b. Hours of operation

Facility	Weekday/Weekend	# of Meals Served

c. In addition to the IFK does the Airmen's Dining Facility or any other facility have any special provisions for ground feeding:

1. Extended operating hours

2. Takeout service

APPENDIX B. Sample Ground Feeding Menus from the Bases Surveyed

Appendix B. Sample Ground Feeding Menus from the Bases Surveyed

Ground Feeding Menu-Fairchild AFB

# 1	# 2	# 3
Ham & Cheese	Hoagie	Fried Chicken
Cup of Noodles	Cup of Noodles	Cup of Noodles

# 4	# 5	# 6
Turkey	Hoagie	Fried Chicken
Cup of Noodles	Cup of Noodles	Cup of Noodles
Chips, Raisins		

Accessory Packages

#1: 2 white milks, 1 pastry, 1 fruit (apple or orange), 1 salad dressing, 2 mustards, 1 lettuce & tomato pack

#2: 1 soda, 1 pastry, 1 fruit (apple or orange), 1 salad dressing, 2 mustards, 1 lettuce & tomato pack

#3: 2 cool-aids, 1 pastry (with ground meal #s 1 and 4, raisins, 1 fruit (apple or orange), 1 salad dressing, 2 mustards, lettuce & tomato pack

Ground Feeding Menu Wurtsmuth AFB

LARGE

#1	#2	#3	#4
Ham & Cheese Sand	Fried Chicken 1/4	Bologna Sand	Sub Sand Bologna
Bologna Sand	Salami Sand	Mini Sub	Orange Drink (2)
Oatmeal Cake	White Milk	Orange Drink	Oatmeal Cake
Chips	Oatmeal Cookies	Apple	Boiled Egg
Life Saver	Orange	Boiled Eggs	Mustard (2)
Salad Dressing(2)	Salt & Pepper (2)	Salad Dressing (2)	Salad Dressing
White Milk (1)	Mustard (1)	Mustard (1)	Salt & Pepper (2)
Orange Drink (1)	Reeses Single		

#5	#6	#7	#8
Roast Beef Sand	Ham & Cheese Sand	Turkey Ham & Cheese	Bologna-Ham &
Peanut Butter &	Salami Sand	Bologna Sand	Cheese Sand
Jelly Sand	Chocolate Milk (2)	Orange Drink	Turkey Sand
White Milk (2)	Orange	Orange	Milk White (2)
Apple	Chips	Chips	Apple
Boiled Egg	Boiled Egg	Boiled Egg	Boiled Egg
Salad Dressing (1)	Keebler	Salad Dressing (2)	Salad Dressing(2)
Keebler	Salad Dressing (1)	Snicker	Pudding
	Mustard (1)		
	Salt & Pepper (2)		

Appendix B. Sample Ground Feeding Menu from The Bases Surveyed (cont'd)

Ground Feeding Menu Wurtsmuth AFB (cont'd)

#9	#10
Turkey Sand	Fried Turkey Fillet on a Sesame Bun
Ham Sand	Bologna Sand
Chocolate Milk (2)	Chocolate Milk (2)
Orange	Chips
Egg	Orange
Salad Dressing	Life Saver
Butter Finger	Salad Dressing (2)
Salt & Pepper	Oatmeal Cake

MEDIUM

#1	#2	#3	#4
Ham & Cheese	Fried Chicken 1/4	Mini Sub	Peanut Butter & Jelly Sand
Chocolate Milk (1)	Orange Drink (1)	Orange Drink (1)	White Milk (2)
Apple	Apple	Orange	Chips
Boiled Egg	Swiss Cake	Chips	Apple
Chips	Salt & Pepper	Mustard	Boiled Egg
Snicker	Boiled Egg	Salad Dressing	Salt & Pepper
Salad Dressing	Chips	Egg	Swiss Cake
Salt & Pepper	Salt & Pepper	Salt & Pepper	

SMALL

Bologna Sand	Salami Sand	Turkey Sand	Ham Sand
Orange Drink	White Milk (1)	Chocolate Milk (1)	Orange Drink (1)
Oatmeal Cake	Boiled Egg	Apple	Boiled Egg
Chips	Chips	Salad Dressing	Swiss Cake
Salad Dressing (1)	Mustard (1)	Chips	Salad Dressing(1)
Boiled Egg	Oatmeal Cake		Salt & Pepper
Salt & Pepper	Butter Finger		
	Salt & Pepper		

Appendix B. Sample Ground Feeding Menu from The Bases Surveyed (cont'd)

January 1982

RE-HEAT MENU FOR Special Security Police

#300
Fried Turkey Cutlet
Mashed Potatoes
Cream Style Corn
Chicken Gravy
Bread & Butter (2)
Orange Juice (2)
Orange
Oatmeal Cake
Baby Ruth
Pudding
Salt & Pepper (2)

#301
Roast Beef
Mashed Potatoes
Cream Style Corn
Brown Gravy
Bread & Butter (2)
Chocolate Milk
Chips
Pudding
Salt & Pepper

#302
Grilled Cube Steak
Mashed Potatoes
Buttered Peas
Brown Gravy
Bread & Butter (2)
Swiss Cake
Orange Drink (2)
Steak Sauce (2)
Salt & Pepper (2)
Apple

#303
Fried Veal Cutlet
Mashed Potatoes
Buttered Peas
Brown Gravy
Bread & Butter
White Milk (2)
Apple
Salt & Pepper (2)
Pudding
Chips

#304
1/4 Fried Chicken
Mashed Potatoes
Cream Style Corn
Chicken Gravy
Bread & Butter (2)
Chocolate Milk (2)
Apple
Oatmeal Cake
Salt & Pepper (2)

Appendix B. Sample Ground Feeding Menu from The Bases Surveyed (cont'd)

Ground Feeding Menu Minot AFB

SUNDAY & MONDAY

2 Pc Chicken
1 ea Ham Sandwich
2 ea Milk
1 ea Reese Cup
1 ea Chips - Potato
Condiments

1 ea Salami & Cheese
2 Pc Chicken
2 ea Orange Drink
1 ea Chips - Corn
1 ea Nuts
Condiments

TUESDAY

1 ea Turkey
1 ea Bologna
1 cn Peaches
1 ea Reese Cup
1 ea Chips - Corn
2 ea Milk
Condiments

1 ea Bologna & Cheese
1 ea Submarine
1 ea Orange
2 ea Milk
1 ea Pudding
1 ea Chips - Potato
Condiments

WEDNESDAY

1 ea Salami
2 Pc Chicken
2 ea Milk
1 ea Chips - Corn
1 cn Pudding
Condiments

1 ea Bologna & Cheese
1 ea Turkey
1 ea Apple
2 ea Milk
1 ea Chips - Potato
1 ea Reese Cup
Condiments

THURSDAY

1 ea Submarine
1 ea Turkey
2 ea Orangeade
1 ea Chips - Corn
1 ea Asst Cake
Condiments

1 ea Bologna
2 Pc Chicken
1 ea Orangeade
1 ea Milk
1 ea Reese Cup
1 ea Egg
1 ea Chips - Potato
1 ea Apple
Condiments

Appendix B. Sample Ground Feeding Menu from The Bases Surveyed (cont'd)

Ground Feeding Menu Minot AFB

FRIDAY & SATURDAY

1 ea Ham Sandwich
1 ea Bologna & Cheese
2 ea Milk
1 ea Egg
1 ea Reese Cup
1 ea Apple
1 ea Chips - Corn
Condiments

1 ea Bologna & Cheese
1 ea Submarine
1 ea Milk
1 ea Nuts
1 ea Cake
Condiments

SUNDAY THRU THURSDAY

1 ea Ham & Cheese
1 ea Apple
1 ea Chips - Corn
1 ea Milk
1 ea Oatmeal Cookie
Condiments

1 ea Ham Sandwich
1 ea Orange Drink
1 ea Egg
1 ea Nuts
Condiments

Appendix B. Sample Ground Feeding Menus from the Bases Surveyed (cont'd)

F. E. WARREN FOIL PACK MENU
ITEM NO. AND DESCRIPTION

#22 Breaded Pork Chops
#23 Roast Beef
#24 Roast Turkey
#26 Grilled Ham Steak
#28 Fried Fish Portions
#29 Country Style Steak
#30 BBQ Beef Tips
#31 Fried Chicken
#32 BBQ Pork Slices
#33 Chili w/ Beans
#35 Beef Pot Pie
#37 Spaghetti w/ Meat Sauce
#40 Salisbury Steak
#41 BBQ Chicken
#42 Meat Loaf
#53 Buttered Mixed Vegetables
#54 Buttered Peas
#55 Baked Beans
#44 Buttered Rice
#45 Macaroni and Cheese
#46 Mashed Potatoes
#48 Sweet Potatoes
#49 Au Gratin Potatoes
#58 Buttered Corn
#70 Plain Cake
#72 Chocolate Cake
#73 Yellow Cake
#74 Apple Pie
#76 Peach Pie
#90 Swiss Steak
#91 Spanish Beef w/ Macaroni

APPENDIX C. Compilation of Customer Comments Regarding Food Service

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Appendix C. Compilation of Customer Comments Regarding Food Service

Food Quality

1. The quality of the bag lunches (dubbed "bag nasties" by the personnel) is poor. Particular complaints concerned the fatty troop-issue ham, the fact that some meat is so unidentifiable that personnel call it "mystery meat," the "soapy" bologna, and the fact that often the sandwich bread is stale. Personnel would prefer their sandwiches to be over-stuffed deli-type sandwiches.

2. Personnel feel the menus are too repetitious and lack variety.

3. Sometimes milk is issued past its expiration date and sandwiches are over 24 hours old.

4. Some personnel feel there is too much "junk" food and not enough vegetables in the bag lunches and would rather not eat at all during their shift than take a bag lunch.

5. Security Police stationed in the Fire Team Response Facility at the Weapons Storage Area are dissatisfied with the way in which their microwave oven heats their meals. Apparently, the white foam container tends to melt in the microwave and SP claim that they can taste a white foam flavor in their food.

6. Personnel noticed the fact that when they pick up bag lunches at the in-flight kitchen, sometimes the food service personnel were careless in handling their meals (for example, bag lunches tossed, instead of handed to the customer).

7. White foam containers used to heat foil packs warps when heated in the microwave and the food acquires the taste of the white foam.

8. A major concern by all parties was whether there were enough calories in the ground meal.

9. Security police interviewed thought that hot meals from the In-Flight Kitchen might be more popular if the menu were varied.

10. Portion sizes are not consistent (for example, sometimes one person gets three fishsticks and another gets four).

11. Combinations of various food items, particularly mashed potatoes and spaghetti with meat sauce, were perceived as being incompatible.

12. Variety is limited, especially in the selection of starches (mashed potatoes are offered in more than half of the meal selections).

13. Sometimes milk is issued to the security police when it is past the expiration date.

14. The quality of meals sent from the dining hall to the WSA are not satisfactory with respect to taste and appearance. Food tends to run off the paper plates and saturate the contents of the paper bags and the meats, gravies, vegetables, and starches all tend to get mixed together.

Food Cost

1. The maintenance squadron recommends that the allowance for the ground meal be the same as the flight meal to increase the quality and quantity of the items in the meal. This recommendation stems from the fact that those are personnel unable to eat conveniently a full hot meal while maintaining equipment.

2. Many personnel with a requirement for meals are stopping at a store on the way to the missile field to obtain food rather than getting ground meals before leaving.

3. It is the opinion of two security police interviewed that the most popular ground meals are those with the greatest amount of food for the least cost, such as peanut butter and jelly.

4. Ground meals are selected above hot meals because they are perceived to be a better value, and because the quality of the hot meal deteriorates upon reheating (for example, gravy tools, congeals, and remains congealed upon reheating; white foam containers warp and impart a flavor to the food).

5. Tremendous concern was generated over the potential loss of BAS status upon introduction of a new system. Presently 50% or greater of the personnel requiring meals away from the dining facility are on BAS. BAS is perceived by personnel as a benefit rather than necessary due to the type of duty they have.

6. Quantity of food is too small.

7. Meals are too expensive.

8. Security police voiced an objection to the $1.50 limit placed on SIK box lunches. Portion sizes in the $1.50 box lunches were seen as inadequate.

9. Maintenance personnel could not understand why they were being charged more for an MCI ordered during lunch hours than for a MCI ordered during breakfast hours.

Appendix C. Compilation of Customer Comments Regarding Food Service (cont'd)

Food Availability

1. Many of the troops do not have access to hot water and yet are still receiving a Cup-of-Noodles in their bag lunches. These personnel, therefore, want to either have access to hot water or to have the Cup-of-Noodles removed from their lunch and replaced.

2. WSA Security police eating in the Survival School dining hall (Fairchild AFB) would like to have the Survival School dining hall hours extended so that they would have more than 15 minutes to select, pay for, and consume their meals and so that they could also have their midnight meal there.

3. Personnel mentioned the fact that on those occasions on which they have gone to a dining facility to eat after their shift was over (which often is the last ½ of a meal period), there was usually only one A-ration entree left to select from because the facility had run out of the other choices.

4. Maintenance teams currently without access to a refrigerator, microwave, or hot water source would like to have access to them.

5. Personnel would like to have their meals delivered to them just like the Command Post has theirs delivered.

6. Security police in the WSA area want a mobile food van serving short order.

7. Security police would most prefer to be able to go to the dining facility to eat.

8. Security police recommend expanding the hours of the Alert Dining Facility to include a midnight meal to accommodate personnel on duty during that shift. Security police would like a choice of either short order or breakfast during the midnight meal.

9. Meals are not delivered on time.

10. The security police would prefer to pick-up their own meals rather than have them delivered by the dining hall. They feel that if they could pick up their own meals then they would always get all the meal components they are entitled to (apparently meals have been delivered to Manzano at Kirtland area missing a salad, condiment package, etc.)

Appendix C. Compilation of Customer Comments Regarding Food Service (cont'd)

11. Kirtland security police feel that their food service needs would best be satisfied by opening the Manzano area dining hall.

12. Security police in the WSA do not always get what they order from the dining hall. It was suggested by the security police that individual buck slips rather than a SAC Form 42 be used to order meals.

13. WSA security police believe that their food service needs could best be satisfied by having the dining hall deliver their meals. Security police felt that they should receive the same services as Oscar I launching facility.

14. Maintenance Personnel would like to receive supplements to their box lunches which are not MCIs (Meal, Combat Individual).

15. Before the start of a la carte operations at Whiteman, bread, peanut butter, and coffee were left out at the LCFs for Maintenance Teams who could stop there, when convenient, and make themselves sandwiches and coffee. Maintenance personnel would like to see this system reinstituted.

16. The system of requiring two hour advance notice for meals is an inconvenient time frame for customers due to their inability to judge that far in advance that they would need a meal.

Appendix D. Packaging Recommendation for the Three Alternative Systems

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Appendix D. Packaging Recommendations for the Three Alternative Systems

Food Item	Suggested Manufacturer	Product Material	Product ID #	Dimensions/ Capacity	Cost
Sandwiches w/ rolls	Anchor	Plastic Cont.	AL1404	6" x 6" x 2 1/2	.085
Breads	Anchor	Plastic Cont.	AL1405	6" x 6" x 2 1/2"	.080
Pizza, Submarine Sandwiches	Bagcraft	Wax Sheet	373	12" x 16"	.011
Taco, Burritos Hamburgers, Fish & Chicken Sand	Bagcraft	Wax Sheet	397	12" x12"	.008
Hot Dog Salad	Bagcraft	Wax Sheet	392	9" x 12"	.005
Pie	Anchor	Plastic Cont.	AL1303	1/7 of 9"	.035
Tossed Salad	Ekco	Plastic Cont.	9192/9193	5 7/8" x 4	.065
Chili/Stew	Sweetheart	Ovenable Paper-Board	TR4185	14 oz	.086
Soup	Thompson Cup	Styrofoam	02-31 0062 02-31 0132	12 oz	.050
French Fries, Onion Rings, Fried Vegetables	Bagcraft	Wax Grease Proof Bag	461	3 1/2 oz	.006
Chinese Entrees	Keyes Fibre	3 Section Foam Container	70003 FST-3	9 1/2 x 7 3/4" x 3"	.073
Hot Beverages	Thompson Cup	Styrofoam Cup & Lid	02-310208 02-310008	8 oz	.020
Fried Chicken	Bagcraft	Foil Bag	480	4" x 3" x 10 1/2"	.044

APPENDIX E. Cost and Description of Products Recommended for Use with Hot and Cold Meals in the Central Deli

Appendix E. Cost and Description of Products Recommended for Use with Hot and Cold Meals in the Central Deli

Product Name/ product	Manufacturer	Descriptions	Cost/Item
Thermos Bottle	Thermos	One pint, wide mouth	$ 5.25
Cooler	Igloo	Lunchmate	$ 9.34
Cooler	Igloo	Playmate Plus	$18.15
Cooler	Security Corp of America	Small Super Cooler	$ 8.50
Freezer Pack	FDC Packaging, Inc.	Koolit Refrigerant	$ .43

APPENDIX F. Summary of Menu Items and Costs at the Three Alternative Operations

Appendix F. Summary of menu items and costs at the three alternative operations

Menu Item	Cost $	Central Deli	Modular Unit	Satellite Dining Facility
Entrees				
Hot Dog	.17		X	X
Hamburger	.29		X	X
Cheeseburger	.32		X	X
Fried Chicken	.68		X	X
Tacos (2)	.49			X
Burritos	.49			X
Enchilada	.35			X
Western Sandwich	.19			X
Fried Fish Sandwich with Cheese	.62		X	X
Pizza	.24			X
Fried Veal Sandwich with Tomato Sauce and Cheese	.78		X	X
Chicken Sandwich	.57			
Egg Roll	.25			X
Fried Rice	.28			
Beef and Vegetables	.59			X
Sandwich Fillings				
Tuna Salad	.17	X	X	X
Egg Salad	.04	X	X	X
Chicken Salad	.37	X	X	X
Ham Salad	.27	X	X	X
Roast Beef	.61	X		X
Turkey	.23	X	X	X
Ham	.38	X		X
Corned Beef	.46	X		
Pastrami	.31	X		
Bologna	.19	X		
Salami	.38	X		
Italian Cold Cuts	.50	X	X	X
American Cheese	.11	X		X
Provolone	.10	X		X
Swiss Cheese	.13	X		X

Appendix F. Summary of menu items and costs at the three alternative operations (cont'd)

Menu Item	Cost $	Central Deli	Modular Unit	Satellite Dining Facility
Sandwich Fillings (cont'd)				
Hot Sausage	.51	X	X	X
Hot Meatball with Cheese	.66		X	X
Shaved Steak with:				
Eggs	.58		X	X
Cheese	.60		X	X
Mushrooms	.64		X	X
Peppers	.57		X	X
Onions	.51		X	X
Bread				
White Bread	.08	X		
Wheat Bread	.08	X		
Rye Bread	.08	X		
Pumpernickel Bread	.08	X		
Sesame Roll	.11	X		
Onion Roll	.11	X		
Poppyseed Roll	.11	X		
Water Roll	.11	X		
Submarine Roll	.12	X	X	X
Soups, Stews and Salads				
Beef Stew	.64	X		X
Vegetable Beef Soup	.20	X		X
Clam Chowder	.30	X		X
Tomato Soup	.15	X		X
Chicken Noodle Soup	.08	X		X
Chili	.45			X
Tossed Salad	.16	X	X	X
Cole Slaw	.06	X	X	X
Macaroni Salad	.06	X	X	X
Potato Salad	.07	X	X	X
Chef Salad	.22	X		X

Appendix F. Summary of menu items and costs at the three alternative operations (cont'd)

Menu Item	Cost $	Central Deli	Modular Unit	Satellite Dining Facility
Beverages, Side Orders, Deserts				
Nachos	.55			X
Cake	.08	X	X	X
Pie	.17	X	X	X
Fruit	.08	X	X	X
Cookies	.05	X	X	X
Brownies	.09	X	X	X
Jello	.07	X	X	X
Pudding	.12	X	X	X
Chips	.12	X	X	
Tortilla Chips	.20	X	X	
Fritos	.20	X	X	
Pretzels	.20	X	X	X
Milk	.13	X	X	X
Soda	.19	X	X	X
Fruit Juices	.29	X	X	X
Fruit Punch	.29	X	X	X
Iced Tea	.19	X	X	X
Tea	.01	X	X	X
Coffee	.06	X	X	X
Hot Chocolate	.09	X	X	X
French Fries	.08			X
Fried Vegetables	.25-.29			X
Onion Rings	.18-.26			X
Condiments				
Ketchup	.01	X	X	X
Mayonnaise	.02	X	X	X
Mustard	.01	X	X	X
Relish	.01	X	X	X
French Dressing	.02	X	X	X
Italian Dressing	.02	X	X	X
Thousand Island Dressing	.02	X	X	X
Salt and Pepper	.00	X	X	X
Lettuce	.01	X		
Tomatoes	.05	X		
Pickles	.02	X		

APPENDIX G. Cost of Sample Menus

Appendix G. Cost of Sample Menus

I. Central Deli Operation

Item	Cost
2 Roast Beef Sandwiches on Wheat Bread	$1.38
2 Packages of Mayonnaise	$ .04
1 Tossed Salad	$ .19
1 Thousand Island Dressing	$ .02
Soda	$ .19
Cake	$ .08
	$1.90
2 Chicken Salad Sandwiches on Rye Bread	$ .90
Tomato Soup	$ .15
Macaroni Salad	$ .06
Pie	$ .17
Brownies	$ .09
Milk	$ .13
	$1.50
Turkey Sandwich on Rye Bread	$ .31
Pastrami Sandwich on Rye Bread	$ .39
One Package of Mustard	$ .01
One Package of Mayonnaise	$ .02
Hot Chocolate	$ .09
	$ .82
Chili	$ .45
Cole Slaw	$ .06
Pudding	$ .07
Soda	$ .19
	$ .77
Bologna Sandwich on an Onion Roll	$ .30
Egg Salad Sandwich on Wheat Bread	$ .12
One Package of Mayonnaise	$ .02
Vegetable Beef Soup	$ .20
Jello	$ .06
Chips	$ .12
Soda	$ .19
	$1.01
Salami Sandwich on Onion Roll	$ .48
Egg Salad Sandwich on White Bread	$ .12
One Package of Mayonnaise	$ .02
Macaroni Salad	$ .06
Chips	$ .12
Hot Chocolate	$ .09
	$ .89

Appendix G. Cost of Sample Menus (cont'd)

II. Satellite Dining Facility

Item	Cost
2 Hot Dogs on Rolls	$ .34
2 Packages of Relish	$ .02
2 Packages of Mustard	$ .02
French Fries	$ .08
One Package of Ketchup	$ .01
Tomato Soup	$ .15
Cake	$ .08
Milk	$ .13
	$ .83
Fried Chicken	$ .68
Onion Rings	$ .22
Tossed Salad	$ .19
One Package of Ketchup	$ .01
One Package of Italian Dressing	$ .02
Jello	$ .06
Soda	$ .18
	$1.37
Egg Roll	$ .25
Fried Rice	$ .28
Beef and Vegetables	$ .59
Fried Vegetables	$ .27
Pudding	$ .07
Soda	$ .19
	$1.65
2 Cheeseburgers on a Roll	$ .64
2 Packages of Ketchup	$ .02
Nachos	$ .55
Cole Slaw	$ .06
Jello	$ .06
Soda	$ .19
	$1.54
Turkey Sub Sandwich	$ .35
Fried Vegetables	$ .27
Tomato Soup	$ .15
Cake	$ .08
Fruit Juices	$ .29
	$1.14

Appendix G. Cost of Sample Menus (cont'd)

II. Satellite Dining Facility (cont'd)

Item	Cost
Veal Sandwich with Tomato Sauce	$ .78
French Fries	$ .08
One Package of Ketchup	$ .01
Macaroni Salad	$ .08
Cake	$ .08
Soda	$ .19
	$1.22

III. Modular Unit

Item	Cost
Fried Chicken	$ .68
Potato Salad	$ .07
Fruit	$ .08
Tortilla Chips	$ .20
Soda	$ .19
	$1.22
2 Cheeseburgers on a Roll	$ .64
2 Packages of Ketchup	$ .02
Tossed Salad	$ .19
One Package of French Dressing	$ .02
Brownies	$ .18
Fruit Punch	$ .29
	$1.34
Hot Meatball Sub with Cheese	$ .66
Macaroni Salad	$ .06
Jello	$ .06
Fruit	$ .08
Milk	$ .13
	$ .99

APPENDIX H. Preference and Cost versus Frequency of Consumption of the Foil Pack Menu

Appendix H. Preference and Cost versus Frequency of Consumption of the Foil Pack Menu

ITEM	COST	FREQUENCY	PREFERENCE	PREFERENCE RANKING
Fried Fish	0.35	16.5	6.39	13
Salisbury Steak	.40	12.3	6.72	8
Chili	.40	11.4	6.62	10
Fried Chicken	.90	10.6	7.38	1
Roast Turkey	.70	7.7	6.96	4
Spaghetti	.35	7.0	7.27	2
Meat Loaf	.50	6.4	6.69	9
Roast Beef	.95	5.1	7.04	3
Country Steak	1.05	4.1	--	-
BBQ Chicken	.90	3.8	6.74	7
Pork Chops	.70	2.8	6.49	11
BBQ Pork	.85	2.7	5.75	15
BBQ Beef Tips	.90	2.6	6.13	14
Ham Steak	.65	2.5	6.82	6
Spanish Beef	.55	1.7	5.04	16
Beef Pot Pie	.75	1.5	6.48	12
Swiss Steak	1.10	1.4	6.94	5

Note: No preference data were available for country steak.

LIST OF ACRONYMS

AF	Air Force
AFB	Air Force Base
AFR	Air Force Regulation
ADF	Airmen's Dining Facility
BAS	Basic Allowance for Subsistence
BDFA	Basic Daily Food Allowance
IFK	In-Flight Kitchen
LCF	Launch Control Facility
MAC	Military Air Lift Command
NRDC	Natick Research and Development Center
SP	Security Police
SAC	Strategic Air Command
SIK	Subsistence-In-Kind
TAC	Tactical Air Command
WSA	Weapons Storage Area